COAL AGE

Vol. 6 NEW YORK, NOVEMBER 14, 1914 No. 20

TO FORMULATE and transmit instructions is but 25 per cent. of the whole job. The big undertaking is to get things done according to schedule.

Every business carries a certain dead-load in the form of salaries paid men who do nothing more than follow up affairs to see that employees obey orders. The comptroller, auditor and treasurer must be alert to see that those who are intrusted with the company cash handle it safely. No set of rules can do this; only eternal vigilance counts. In the case of a coal mine, the operating head must make his workings safe and keep them so. This also requires ceaseless vigilance.

What can I do to save some of the time and money I am spending in following up instructions to see that they are carried out and that the mine is run as I have directed?

The above thought is most persistent in the minds of coal mining executives.

If the letter files of thousands of coal-mine executives could be exhibited, they would be found full of excuses to the "big boss" for failure to carry out his instructions.

It's an old story to most mining men that a large percentage of accidents are preventable. It is equally true that much time is consumed in writing letters, making visits and following up things generally. This is the kind of executive work that hundreds and thousands of men, in all kinds of business, are doing every day. There is much of it that should be eliminated.

Most executives themselves are entirely responsible for the condition that requires an expenditure of 75 per cent. of their time in getting things done.

Do a little introspective work and be honest with yourself. Probably you will find you have never been willing to trust any man under you to do a job all by himself, but persisted in showing him every detail all the way through. You killed initiative, stifled enthusiasm and injured self-confidence on the part of your subordinate. He has learned to wait for you to come along before even starting a job, because he has been taught to feel he can't start the work in the right way.

Don't be an executive of this kind; give your men a chance. Restore their confidence, and they will do wonders for you. While they're accomplishing the work in hand, your time will be free to plan bigger and better things.

Mine officials reading this don't need to be told that it is difficult to acquire foremen and department heads who quickly and satisfactorily carry out instructions. The remedy is a simple one—get men who will. It won't be necessary to make more than one or two changes before the others wake up.

There are two things particularly that coal mine officials cannot afford to do:

1. Acquire knowledge of how to operate a plant successfully by experience alone. The tuition of experience is far too dear and the dividends are rarely paid out of earnings.

2. They cannot afford to keep on giving 75 per cent. of their time to an undertaking in order to get it done. This plan won't insure dividends of the right sort either.

A Modern Method of Mine Development

By Ernest L. Bailey*

SYNOPSIS—Description of a proved plan that may be modified to fit most any case of a panel system of mining. The principal object of the method outlined is the attainment of a maximum percentage recovery.

The question of prime importance to the intending coal-mine operator is "Will it pay?"

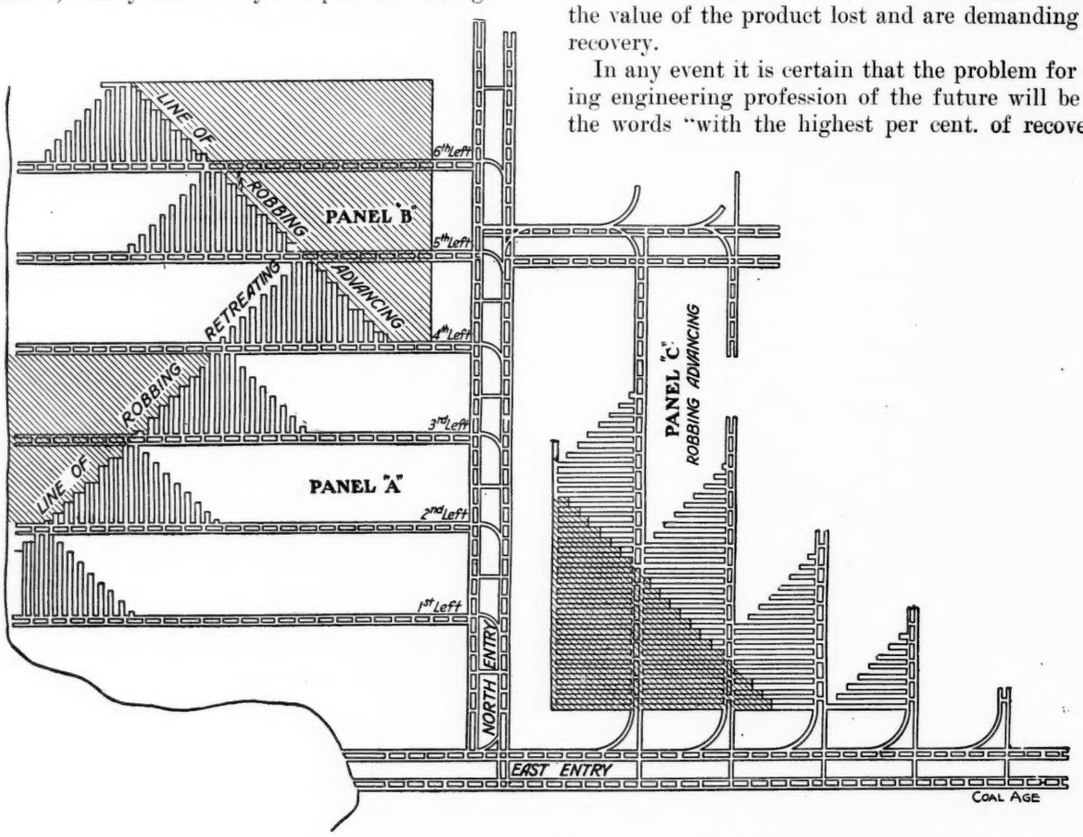
Of the many elements to be considered before a conclusion is reached the three most important are, quality of product, cost of extraction and ultimate recovery.

While the quality of product is largely dependent upon nature and the various processes of cleaning and preparation, the amount and quality of lump produced are, nevertheless, vitally affected by the plan of mining.

No mine should be opened without a carefully projected plan of development. Conditions may arise which will render it inexpedient to rigidly follow this plan, but if due care is exercised in obtaining the engineering data, and the proper knowledge and forethought are brought to play in the formulation of the plan, the general ideas, except in isolated cases, may be carried to completion.

It will hardly be questioned that in most of the coal fields of the United States, too little attention has been paid in the past to ultimate recovery, but with the aroused interest in conservation it seems not improbable that legislation looking to the adoption of a minimum allowable recovery will be enacted in the not far distant future. But should this not occur, the owners are awakening to the value of the product lost and are demanding a higher recovery.

In any event it is certain that the problem for the mining engineering profession of the future will be to write the words "with the highest per cent. of recovery" into the time-honored slogan of "maximum output at minimum cost."



Suggested Plan of Mine Development

Probably the most important factor entering into the cost of production and percentage of total recovery is the human factor. It is doubtful if in any other field of industry an investment will yield a profit or a loss more directly in proportion to the ability—or lack of ability—of the man in charge.

Method of Mining Affects Cost

Aside from the human factor the greatest influence on cost and recovery is exerted by the plan of mining.

It is in the hope of aiding to a solution of this problem or at least in stimulating an interest, that the model plan shown here is submitted.

This plan presupposes machine mining and electric haulage, also that entry work, where required, will be double shifted.

The Underground Layout

The rooms are 400 ft. long and are spaced at 50-ft. centers. They are driven 24 ft. wide leaving a 26-ft.

*Mining engineer, Crumpler, W. Va.

pillar. These rooms are designed for a single track and are limited to 24 ft. in width in the belief, based on personal observation, that this is the maximum width that affords economical shoveling.

Not more than three rooms on any one entry should be driven to completion in advance of the robbing and the line of the faces of the rooms should make an angle with the entry of approximately 40 degrees.

The width of rooms and of pillars is equalized with a 2-ft. margin in favor of the pillars to counterbalance their more rapid recovery. The pillars are mined by machines and drawn by the pocket and stump method. All cross-entries are driven 12 ft. wide on 36-ft. centers, leaving a 24-ft. chain pillar which allows crosscuts to be made without laying a special turnout in the track.

Main entries are driven in pairs on same centers as cross-entries with a 100-ft. chain pillar between each pair. The crosscuts in the main chain pillar are spaced at from 200 to 400 ft. at the discretion of the engineer. This method has the dual object of facilitating ventilation and reducing the cost of stoppings as the stoppings in the short cuts are of a temporary nature and may be of canvas or boards while only the main crosscuts require permanent stoppings.

The robbing of panel *A* is not to start until the robbing of panel *B* has been completed, and room development is to be retarded except an occasional two rooms on Third Left as is required for haulage purposes. The mine should be divided into sections of robbing which would limit the maximum break line to not more than 2000 ft. in length.

Careful Supervision Is Necessary

For the successful execution of this plan strict supervision and careful engineering are absolutely essential. The rooms, as well as entries, should be driven on sights set by the engineer and extended at intervals not exceeding 200 feet.

Each section of robbing and rooms should be placed in charge of a competent section foreman whose duty it is to see that the line of the room faces, as well as the breakline of the pillars, is kept at the desired angle with the entry. This is not difficult with machine mining as it is only necessary to see that each working place receives the same number of cuts. This plan as outlined has the disadvantage of a somewhat more expensive haulage than the ordinary panel method.

Advantages of the System

The advantages claimed for it are as follows: (1) Higher per cent. of recovery and better quality of product due to the fact that no portion of the developed work stands but a short time before pillars are drawn. Roof settlement to an effective extent does not occur on the pillars beyond the line of break, thus allowing a cleaner extraction and yielding a greater amount of lump; (2) reduced cost of production due to the high degree of concentration of the working places; (3) the largest output in the shortest time consistent with safety and mining economies.

The most distressing feature of a model plan is that it will rarely fit any particular instance. It is my opinion, however, that modifications of the above plan may be used in the development of any mine that permits of the panel system.

In the special case for which it was designed, the east entries dip about 1½ per cent. and will eventually have natural drainage.

It might not be amiss to state that experience has gradually forced me to believe that the general horror of dip workings—with an ultimate natural drainage—while probably justifiable enough in the days of the hand pump and water car, is something of a bogey in the days of the electric pump.

Mining Fatalities in West Virginia during September

The list of fatalities in the coal mines of West Virginia during the month of September has just been issued by Earl A. Henry, chief of the department of mines, and shows that thirty miners lost their lives in the state that month, a decrease of two from the records of the previous month.

The list also shows that falls of coal and slate were responsible for sixteen of the deaths, while nine were attributable to mine cars, three to motors, one to electrocution, and one to a railroad car at the tipple.

A British View of Our Export Trade

There can be no doubt that the temporary dislocation of our own foreign business as a result of the war appeared likely to offer our trans-Atlantic competitors opportunities, but they have so far not materialized. Some additional orders for markets in which, as a rule, British coal reigns supreme, have no doubt been taken. Substantial contracts have been booked for Italy, it is reported, and an attempt has been made to invade the Mediterranean generally, while renewed attention is also being bestowed upon South America.

American efforts to sell coal to Europe have never met with much success as yet owing to the heavy ocean freight rate, due partly to unalterable geographical reasons and partly to the difficulty of securing a return cargo. This latter difficulty has been overcome in some cases, but not with sufficient regularity to encourage a permanent trade of any great importance. It must be acknowledged that the export of coal from the United States to Europe rose from 255,000 tons in 1911 to 476,000 tons in 1913; but the strike here in 1912 probably had much to do with the increase, and now, of course, abnormal circumstances are again operating in favor of the Americans. It seems very doubtful whether much of this business will remain when normal conditions are restored, for the reasons to which we have referred already, and even if the total tonnage for 1913 were doubled this year, it would yet remain insignificant compared with our own Continental coal trade.

More success perhaps may attend American efforts to capture the South American markets. So far as the Pacific Coast is concerned, of course, the opening of the Panama Canal has put American exporters in a more advantageous position. It has also to be remembered that so far as Chile is concerned, the nitrate trade with Germany is at an end, and the consequent decrease in the available quantity of return cargo is likely to check our coal trade with the republic, which in 1913 amounted to nearly 600,000 tons.

The Canal, however, will afford the Americans no assistance in the Atlantic states, with which our largest trade is done. It was thought in the United States that our coal shipping trade would be so paralyzed by the war that we should have to virtually abandon the markets in question. Our American friends soon saw they had made a mistake; but it is probable that in view of the handicap imposed upon us by the war they may be able to do more business with the southern republics, and to retain some of it. D. A. Thomas is reported to have said before the war that he feared the United States more than Germany as a competitor of the United Kingdom in the foreign coal trade. Germany is out of the question during the war, while we are hampered to some extent, although not for long we hope, and no doubt the Americans will make the most of the opportunity.—"Iron and Coal Trades Review" (London, England).

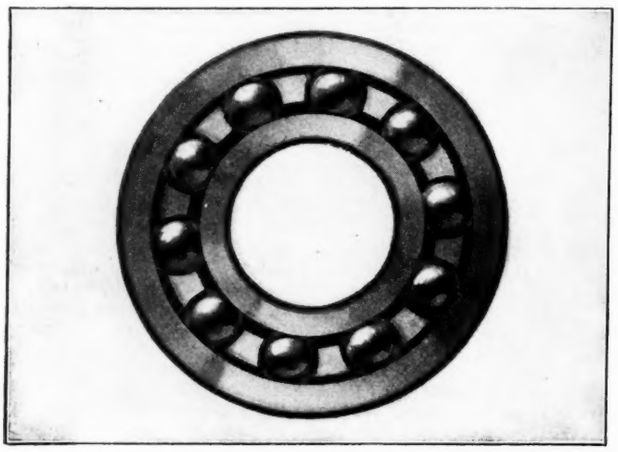
Ball Bearings on Mine Locomotives

By Frederic H. Poor*

SYNOPSIS—The chief reasons for the adoption of ball bearings, particularly on mine locomotives, are here set forth. Contrary to a more or less popular conception, ball bearings require lubrication.

At a time when many types of coal-mining equipment, particularly locomotives, are being fitted with ball bearings, it might be well to inquire exactly what are the causes for this departure from the well known and thoroughly tested type of bearing lined with babbitt or bronze.

At first sight it might appear strange that the subject of motor commutation should have any influence upon



A Heavy-Duty Bearing Used on Mine-Locomotive Motors

the type of bearing employed. Good commutation is, however, directly dependent upon the accuracy and fineness of setting of motor bearings, regardless of their type. To secure the best results motor armatures must revolve smoothly and concentrically with the pole faces. Furthermore, particularly in coal mining, the revolving parts must be kept free from oil which tends to accumulate dust, thus forming a carbonizing compound which endangers the commutation and is extremely liable to cause "flash overs."

In this respect, the compact bearing heads employed in ball-bearing units and the effectual sealing of the lubricant chambers have proved of inestimable value. Protected from the lubricant, the commutators retain their finish and the brushes are kept free from accumulations of a conducting dust or smut on the lead edges.

Another factor which strongly affects commutation is the maintenance of the air gap. Plain bearings are subjected to a continuous rubbing action which causes wear on the bearing surfaces, frequently allowing the shaft to settle out of the true center of the magnetic field, thus necessitating frequent gaging of the air gap and inspection and possible replacement or renewal of the bearing linings.

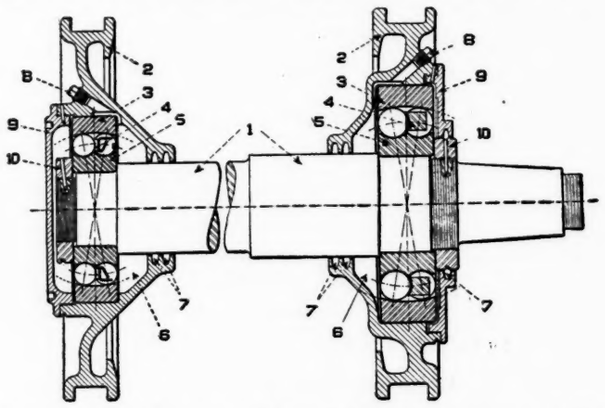
On ball-bearing machines this wear is practically eliminated. Hardened-steel balls roll on hardened races. Rolling is thus substituted for rubbing, and practically continuous accuracy secured. Self-alignment in ball bearings allows them to accept the sudden impulses of load without binding, and insures the best possible load distribution with a minimum pressure per ball.

As an illustration of the results secured with ball bearings, in September, 1914, an inspection of a ball bearing removed from the pinion end of a mining locomotive was made after two years of continual service. During this time the locomotive had traveled approximately 60,000 miles. The bearing showed no appreciable wear, and was immediately returned to service.

Instead of repeated attention to bearings as is required in plain-bearing machines, a weekly filling of the grease cups and an occasional inspection insures long life and the elimination of bearing troubles where ball bearings are employed.

Ball Bearings Must Be Lubricated

The reasons for lubricating ball bearings are two: First, to preserve the highly finished surface of the balls and races from the destructive action of moisture, air and mine gases. Second, to reduce the small amount of friction which exists in such a bearing. In addition to performing these main functions, the grease in the lubricant chamber and sealing grooves helps to protect the bearings against the intrusion of foreign matter from without.



Sectional Drawing of Motor Heads Employing S. K. F. Ball Bearings

1. Armature shaft
2. Motor bearing head
3. Outer bearing race
4. Balls and retainer
5. Inner bearing race
6. Lubricant chamber
7. Grooves to seal lubricant chamber
8. Grease feed pipe
9. Outside housing cap
10. Lock nut to hold inner race on shaft

While it is true that the coefficient of friction for ball bearings is extremely small (approximating 0.0012), this consideration should not lead to the belief that such bearings may be successfully operated dry. Ball bearings *must* be lubricated, and a high grade of grease should be employed and care taken to see that it is chemically neutral in order to avoid possible corrosion of the balls and races by either acid or alkaline compounds contained in the grease.

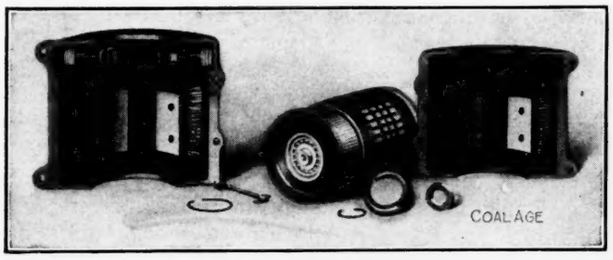
*S. K. F. Ball Bearing Co., New York.

A ball bearing and its mounting are extremely compact and free from rotating oil rings, wicks or waste packing chambers.

Due to their comparative freedom from wear, ball bearings prevent motor armatures from rubbing on the pole pieces. The maintenance of centers insures greater life to the gears, since the latter are held continuously in proper mesh and a higher gear efficiency obtained.

The proper mounting of these bearings requires a tight fit for the inner ball race on the shaft in order that the two may revolve as an integral unit. The outer ball race, on the other hand, should have a "piston" fit in the casing. Such a fit allows the outer race to slowly creep around, thus gradually distributing the bearing load over the complete ball path of the outer race.

The casing containing the bearing should provide a liberal lubricant chamber, which by an extremely simple construction may be sealed against the leakage of the



VIEW OF DISASSEMBLED MINE-LOCOMOTIVE MOTOR

lubricant from within, or the intrusion of water, grit, or other abrasive substances from without.

The advantages of the ball bearing as applied to mine-locomotive motors may be summed up as follows: Freedom from repairs, a material reduction in the amount of lubricant required, long intervals between inspections, good commutation, and decreased wear on the gearing. What is probably more important so far as coal mining is concerned, the locomotives are more dependable and are more nearly constantly in commission instead of being in the repair shop.

Don'ts for Safety Inspectors

1. Don't forget that you are under the direction of the mine foreman.
2. Don't fail to make a daily report, showing what places you have inspected and what has been done in the interest of the safety of the employees.
3. Don't fail to examine and test with a bar the roof, ribs and face of each working place, and also test for gas every time you enter same.
4. Don't forget in your travels to note every condition that may lead to an accident, and report to foreman, noting on your report when such conditions are remedied.
5. Don't fail to examine timbering, and if dangerous, instruct miners to set timber without delay; see that orders are complied with and report same to mine foreman or assistant mine foreman immediately.
6. Don't fail to examine roof and timbers along main haulage roads and travelingways, and report at once any retimbering necessary to be done.
7. Don't fail to examine all safety devices, such as trip alarms, safety blocks at the top of shafts, slopes, planes, etc., reporting to the mine foreman or assistant mine foreman immediately any needed repairs.
8. Don't fail to caution all miners to be careful while trimming down the face after firing a blast.
9. Don't fail to report all abandoned workings and entrances to all dangerous places that should be fenced off, and the sign, "Danger, Keep Out," placed thereon in a conspicuous place.
10. Don't fail to report any person or persons who neglect to notify men in the immediate vicinity when they are about to fire a blast.
11. Don't fail to impress on the miners the importance of sounding the roof and testing for gas in the morning before commencing work, and before and after firing each blast during the day.
12. Don't fail to report to foreman any miners who fire two holes at the same time.
13. Don't allow any person to carry dynamite and caps at the same time, except when taking same into face to be used, and report any violation to the foreman.
14. Don't fail to stop any persons from leaving fuse, caps and exploders in the same box with dynamite, and report any violation.
15. Don't fail to stop any employee from making holes in dynamite with a file or cut spike, in order to insert cap, and report any violation.
16. Don't fail to caution miners who cap fuses with their teeth, and report violations to foreman. A crimping tool should be used.
17. Don't fail to warn the miners that using dynamite and black powder in the same hole is prohibited.
18. Don't permit miners to leave keg of powder on road or alongside of same. Insist that they replace it in box kept for that purpose, and report any violation to foreman.
19. Don't allow tamping to be done with iron or steel bar or needle. If men are not using wooden bars, report at once to foreman.
20. Don't permit miners to leave the wires attached to electric battery. They should be disconnected after the shot is fired. Report violations.
21. Don't fail to report all miners who use a blasting barrel instead of a fuse. They insert a cap in the barrel and explode the same with a squib. This is a dangerous practice.
22. Don't fail to warn miners that they must not leave safety lamps at their tool box. They should have them at their working face.
23. Don't permit any persons when placing relief timber to remove the old sets before placing the new, and be sure they lag, also sprag, where necessary.
24. Don't permit persons to leave lumber, boards or timbers with projecting nails lying loose in any place. Such nails must be removed or bent down close.
25. Don't fail to report all slopes and planes that do not have safety holes.
26. Don't fail to report all door frames and other structures that are erected too close to rail.
27. Don't fail to report all unguarded trolley wires that men are compelled to pass under.
28. Don't fail to report all frogs and switches that are not properly blocked.
29. Don't fail to have the passageways kept clear of obstructions.
30. Don't fail to caution brakemen or others not to stand between the rails and attempt to board locomotive or cars while same are in motion.
31. Don't allow any person to ride on cars unless their duties require it. Report all such violations to mine foreman or assistant.
32. Don't wait for the general inspector to point out dangerous conditions.
33. Don't forget that one of your principal duties is to caution employees of dangerous practices.
34. Don't fail to stop and report any employees who carry a naked lamp in districts where locked safety lamps are used, or in any other section where naked lights are prohibited.
35. Don't forget that we expect you to help us educate the employees to take care of themselves, and this can be done best by personal attention and instruction.
36. Don't forget that thorough and efficient examinations and inspections before accidents bring better results than the same work after an accident.

Note—From Susquehanna Coal Co.'s Book of Instructions.

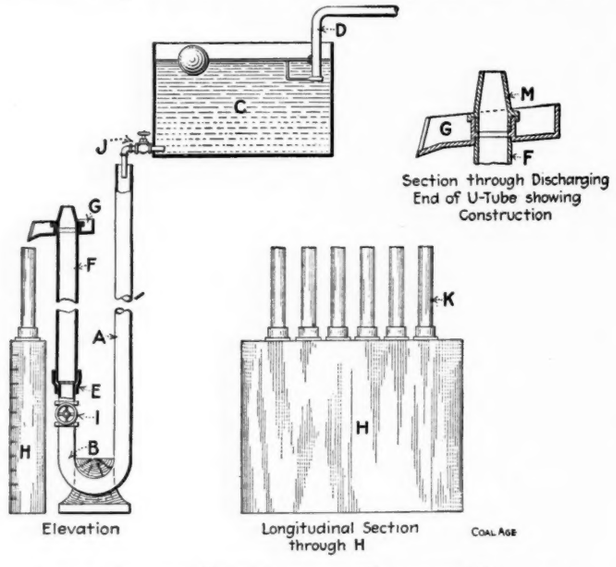
Montana's Coal Production

Montana, according to the U. S. Geological Survey, is essentially a metal-producing state. The values of its copper, gold, silver, zinc and lead represented in 1913 over 89 per cent. of its total mineral production. It is one of the most important Rocky mountain states in the production of coal. This production increased from 3,048,495 tons, valued at $5,558,195 in 1912, to 3,240,973 tons, valued at $5,653,539 in 1913.

Testing Appliance for Coal Washeries

The development of a testing apparatus adapted to determine the percentage of waste in a sample at any stage of the treatment of coal in a washery is due perhaps to L. D. Ford, who has recently given an account of its construction. The same instrument may be used to determine the data necessary for the plotting of the curves of washability of any coal in terms of the percentage of ash content or of the velocity of upward current necessary to hold given sizes in suspension.

The fundamental principle involved in the construction and operation of this instrument is that in virtue of which coal and mineral particles have for their various sizes corresponding velocities of upward current which will just hold them in suspension. Referring to the figure: A head of water *C* is kept constant in its container by the automatic inlet regulator *D*. The valve *J* controls the delivery of water into the downgoing side of a U-



APPARATUS FOR DETERMINING WASTE OF COAL IN A WASHERY

tube. The upgoing side *B* is interrupted by the valve *I* and the connecting piece *E*.

The upper portion *F* is of glass, and is terminated above by a cup *G* and the metal nozzle *M*. A graduated reservoir *H* is provided with a number of inlet tubes *K*. The cup *G* may deliver to any one or all of these tubes. The nozzle is tapered on the interior in order to add to the velocity of a current passing through the instrument. A piece of gauze is placed in the connecting piece *E*, the mesh of which is finer than the mineral to be tested. Also, similar gauze is used at the bottom of the tubes *K*. The foregoing arrangements have in view the provision of an upward current in *F* of uniform velocity.

Upon opening *J*, a current of water will flow through the U-tube and discharge into the reservoir. The velocity in *F* may be calculated by noting the total quantity of water discharged into *H* in an observed interval of time and taking the cross-section of *F* into account. In order to avoid repeated calculations, a curve may be constructed once for all, showing the variations in velocity corresponding to variations in the position of the valve *J*. It will be convenient to have a circular scale attached to this valve in order to note its position with accuracy.

ELIMINATING THE QUESTION OF VELOCITY

Another curve may be made which will show the variations in velocity compared with the variations in size of particles held in suspension in the glass tube. These particles should be free from refuse. Instead of making two curves, we may dispense with velocity altogether and construct a single curve comparing variations in valve position with variations in size of particles. We should thus eliminate all calculations on velocity.

Suppose now we wish to test a sample of coal or other mineral taken from a washery. The sample is supposed to contain particles of uniform size. We put it in the tube *F* and start the current. The valve *J* should now be opened to a point just a little beyond the point shown by the curve to correspond with the size of the mineral particles in the sample. The good material will now be driven out, the residue in *F* remaining on the gauze. This when dried and weighed may be compared either with the total weight before testing or with the weight of the particles driven out, caught in one of the tubes *K*, and similarly treated.

We may construct a curve of washability as follows: The sample, containing miscellaneous sizes, is put into the tube *F* and the current turned on gradually until the smallest particles are just floated off. We then observe the position of the valve *J*. The particles are collected in one of the tubes *K*. By opening *J* further and further, we may get a series of positions of the valve corresponding with a series of sizes. We collect these various sizes in separate tubes, and dry, weigh and calcine the contents of the tubes separately. A curve of washability may now be constructed charting the sizes and either the valve positions or the actual velocities.

Coal Production of the Transvaal

Although the gold-mining industry is of preëminent importance in the Transvaal, says the *Daily Consular and Trade Reports,* it has other valuable mineral deposits, including diamonds, coal and base metals, in the mining of which gratifying progress was shown during the past year. The purchases of coal mined in the Transvaal showed an increase from 4,751,850 tons in 1912 to 5,225,036 in 1913. An export trade for coal now having been established, there is every reason to believe that the Transvaal coal industry will continue to expand.

The total stores consumed by the mines of the Transvaal during 1913 amounted to $56,503,913, compared with $54,183,080 in 1912, an increase of $2,320,833. The purchases of machinery and machine tools and electrical machinery alone, which are practically all imported, amounted to $4,399,783. To show the predominance of the Transvaal over other Provinces of the Union as a customer for mine supplies, it is only necessary to state that of the total stores consumed by the mines of the entire Union of South Africa in 1913, amounting to $64,755,084, the Transvaal consumption was about seven times that of all other Provinces combined.

The Pittsburgh Coal Field in Western Pennsylvania

By H. A. Kuhn*

SYNOPSIS—The writer states that the Youghiogheny gas-coal field, which lies roughly between Marianna and Irwin, has a prospective life only one-seventh as long as the anthracite field. The exhaustion of the natural gas around Pittsburgh and the securing of freight rates for coke comparing favorably with those for coal together secure for Pittsburgh the prospect that fuel will not be largely shipped to other points for coking purposes, but will be coked at home. The southern Illinois coking-coal field does not seem a dangerous competitor of Pittsburgh.

The Pittsburgh coal field in western Pennsylvania is conceded to be the most important in the world. To measure its value it is necessary to understand the extent of its service to the various industries of the country. Probably 90 per cent. of the pig iron manufactured in the United States up to the present time has been made by using coke manufactured from the Pittsburgh coal seam in western Pennsylvania. This coal field is the foundation on which the city of Pittsburgh rests. It has caused the great growth of the iron industry in that district.

Pittsburgh would not be the natural center for iron and steel manufacture if it were not for its fuel. As it is, the ore is brought 1100 miles for treatment and the manufacturer is placed by the location of the industry at the mercy of the railroads.

The Outside Market of Pittsburgh

The illuminating-gas interests have shown an equal preference for Pittsburgh coal and 20 to 25 per cent. of the fuel used on railroads in the United States comes from this field. The Pittsburgh coal field is unquestionably the center of the industrial population of the United States, for in addition to the industries of the district and those closely adjoining, it has tributary to it all the cities and industries along the Great Lakes. Furthermore, practically all Canada, with the exception of the extreme western and eastern ends, is supplied with coal from this district. It furnishes the industries and population of points many hundreds of miles west of Duluth and Superior.

This coal is floated down the Ohio and Mississippi Rivers, supplying the towns *en route,* and is delivered in New Orleans, a distance of 2200 miles, for approximately 80 to 90c. per ton transportation cost. It is delivered on the docks of Superior and Duluth at a cost of transportation 50c. a ton less than the cost of transporting the same coal from Pittsburgh to a local consumer in Philadelphia. With other Appalachian coals it has large markets east and along the seaboard, especially for by-product-coke making and the illuminating-gas industry.

It is considered the leading railroad fuel because when consumed in a locomotive of any given size, it will haul more cars than any other coal in the world. Tests made at Altoona by the motive-power department of the Pennsylvania Railroad Co. show that Pittsburgh gas coal evaporates as much as 18.9 lb. of water per square foot of heating surface. It is stated that the lower-volatile coals, with a theoretically higher heat value per pound of fuel, do not evaporate more than 12 or 13 lb. of water for the same unit area of heating surface. For this reason this important railroad has adopted this coal as its standard fuel. By its use with the same crew and engine a maximum number of cars may be hauled.

Pittsburgh Coal from Pittsburgh District Supplies 28 Per Cent. of U. S. Production

These statements explain in part the enormous production of coal from this field and seam, which was, in 1913, approximately 100,000,000 tons. The Ohio production from the same seam was about 20,000,000 and that of West Virginia 10,000,000 tons. Thus a total tonnage of approximately 130,000,000 tons is produced from the Pittsburgh seam in this field. This is a large proportion of the total output of the United States, which was 470,000,000 tons in the same year.

Of the 170,000,000 tons of bituminous coal produced in Pennsylvania approximately 100,000,000 tons comes from the Pittsburgh seam. Fayette and Westmoreland Counties with only a small acreage left of unmined coal are now producing approximately 60,000,000 tons of coal annually; Allegheny and Washington counties produce about 20,000,000 tons each; Greene County has only recently started as a producer of coal but its capacity is now 2,000,000 tons a year.

The Regularity of the Coal Bed

The geology of the Pittsburgh coal measure is so well understood that it is not worth while discussing this field from that standpoint. Some practical features, however, which relate to its geology are interesting. The main feature of this seam from a geological standpoint is its persistency and integrity over the area which it covers. Though the coal may not have been opened on any given area, nevertheless those who are familiar with each zone or subdistrict (and the slow but uniform change from one basin to the next) can state unreservedly how thick the bed is within a small percentage, how much sulphur it will probably contain and about how many tons per acre may be recovered.

Thousands of miles of entries have been driven through this coal field in mining operations of the district and even where it is not being mined thousands of oil wells and gas wells have been drilled through it; from the records thus obtained several facts have been deduced which are worthy of comment.

The plant life which formed this field of coal was extremely luxuriant, increasing in depth or density toward the east. The purest and largest part of this coal field has been lost through corrosion. This seam in the Georges Creek field near Cumberland, Md., measures as

*President, Pittsburgh-Westmoreland Coal Co., Fulton Bldg., Pittsburgh, Penn.

Note—Article submitted to the American Institute of Mining Engineers at the Pittsburgh meeting, Oct. 9, 1914.

much as 16 ft. in thickness, whereas on its western outcrop in Ohio it is only about 3½ to 4 ft. thick. In the northwestern end of Allegheny County in western Pennsylvania near the state line the main or working bench of coal measures about 4½ ft. and the roof coal is 2½ to 3 ft. thick, the working bed being separated from the roof strata by what is known as the "draw slate" of the district, which averages from 8 to 14 in.

In the Connellsville field the coal at places attains a thickness of 8 ft. and on the southern boundary of Greene County near the Monongahela River it measures 9 to 10 ft. in thickness. In the southern extension of this seam in West Virginia the roof coal and main or working bed of the Pittsburgh district become practically one solid bench of coal with only thin laminations of slate marking the divisions which are so noticeable in the northern part of the field.

It may be said from an inspection of the geological map and from a knowledge of the quality of the coal that not only was the plant growth that formed this fuel much more luxuriant in the eastern end but that the coal was deposited with less impurities and under quieter conditions. The coal thins going west, but maintains its extreme purity as far westward as the Pinhook anticlinal running southwest from Pittsburgh through Allegheny and Washington counties. West of that anticlinal the change is gradual, the coal becoming more impure, higher in ash and sulphur with progress westward. The working bed or bench also becomes thinner.

The Fuel of the Gas-Coal Basin

The coal containing the least impurities from this seam in the Pittsburgh district is mined from what is known as the "gas-coal basin," which lies between the Pinhook-Murraysville anticlinal on the west and the Waynesburg-Saltsburg anticlinal on the east. The working bed of coal in this basin is on an average about 6 ft. thick. Above this bed and separated from it by the draw slate, 2 to 4 ft. of roof coal is found. The main working bed in this basin as prepared for market contains about 6 per cent. of noncombustible matter, and in some cases less than this, and the average coal contains not over 1 per cent. of sulphur. Coal in the Connellsville basin is equally pure, but because more of the seam is mined in that field

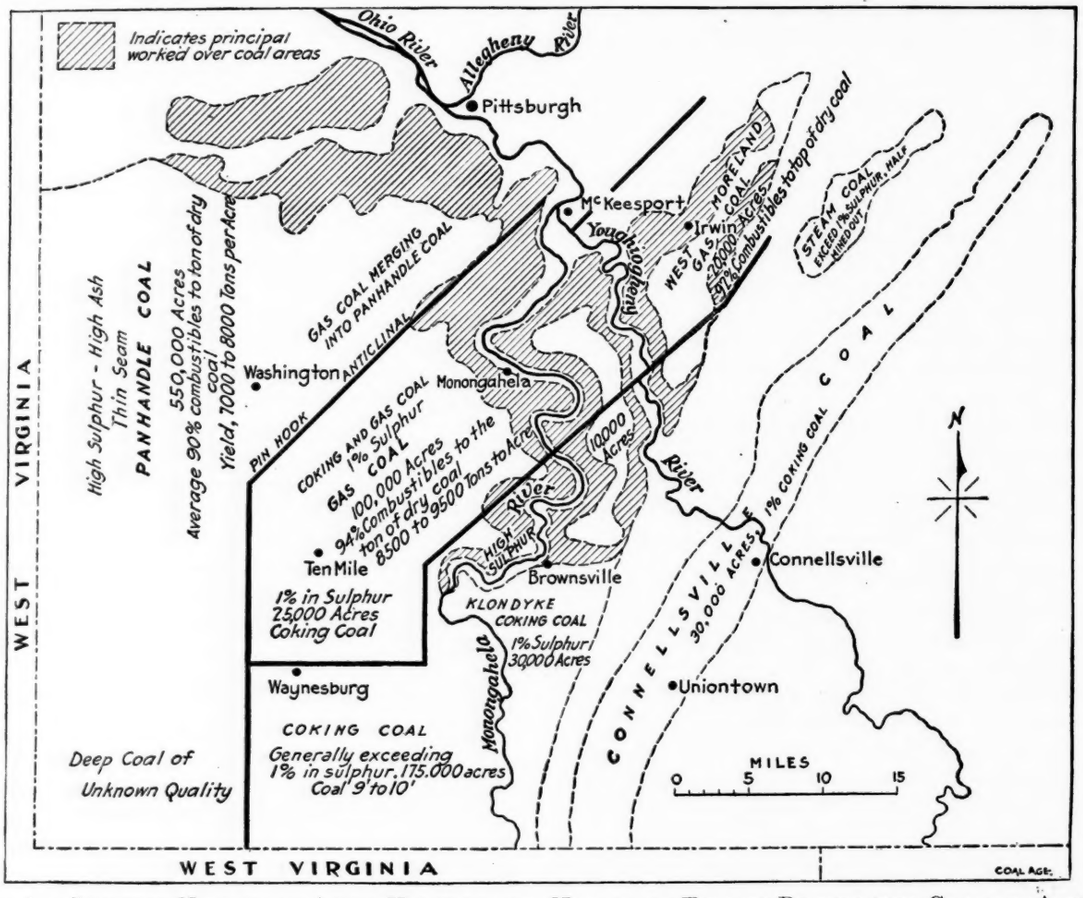


FIG. 1. SHOWING NUMBER OF ACRES UNMINED AND NUMBER OF TONS OF RECOVERABLE COAL PER ACRE, ALSO DIVISIONS OF QUALITY

the ash is usually higher than in the coal produced in the gas-coal field, the sulphur being about the same. In recent years it has been discovered that the lower or southwestern portion of the gas-coal zone makes a standard coke, the difference between it and that from Connellsville coal is that the former, because of its hardness, has to be crushed before it is put into the coke ovens, unless only the slack coal is used. This greater hardness is, however, an advantage in its sale as the lump coal is sold at the mine for shipment at a normal price of $1.40 per ton, which is equivalent to a price for coke (including its cost of manufacture based on beehive-oven practice) of $2.50 per ton on the car at the oven wharf.

The Pittsburgh coal field in western Pennsylvania west of the Monongahela River and within the state lines com-

prises about 850,000 acres of unmined coal today. In order to understand the available tonnage per acre in this field of coal and the values in various parts of the coal field it is necessary to subdivide it into zones of quality and thickness. To comprehend its value fully it is necessary to subdivide it further into zones differentiating production cost, this further division having relation to the cost of mining and of transportation. The thickness of the coal in the various parts of the field determines the available tons per acre, which in turn becomes a factor in the valuation of the land. To measure the value of the properties in the different subdivisions or zones, all the factors, quality, tons of recoverable coal to

OVENS AND ACREAGE IN 1912 IN CONNELLSVILLE FIELD

	Number of Ovens		
	Tax List	Connellsville "Courier"	Acres
Old Basin	22,985	20,361	32,461
Klondike	12,784	12,377	33,029
Total	35,769	32,738	65,490

OVENS GOING OUT OF BLAST IN CONNELLSVILLE FIELD, DUE TO EXHAUSTED ACREAGE

	Old Basin	Klondike	Total
In next 3 years	5,393	1,310	6,703
In next 5 years	7,097	2,052	9,149
In next 10 years	11,940	3,814	15,744
In next 15 years	14,529	5,270	19,799
In next 17 years	17,491	6,130	23,621

After 17 years there will be, of all the ovens shown, 5494 in the Old Basin and 5881 acres of coal land unexhausted. These ovens will have an average life of a little over 9 years. In the Klondike district there will be 6654 ovens and 9501 acres of coal. These ovens will be able to run a little over 13 years.

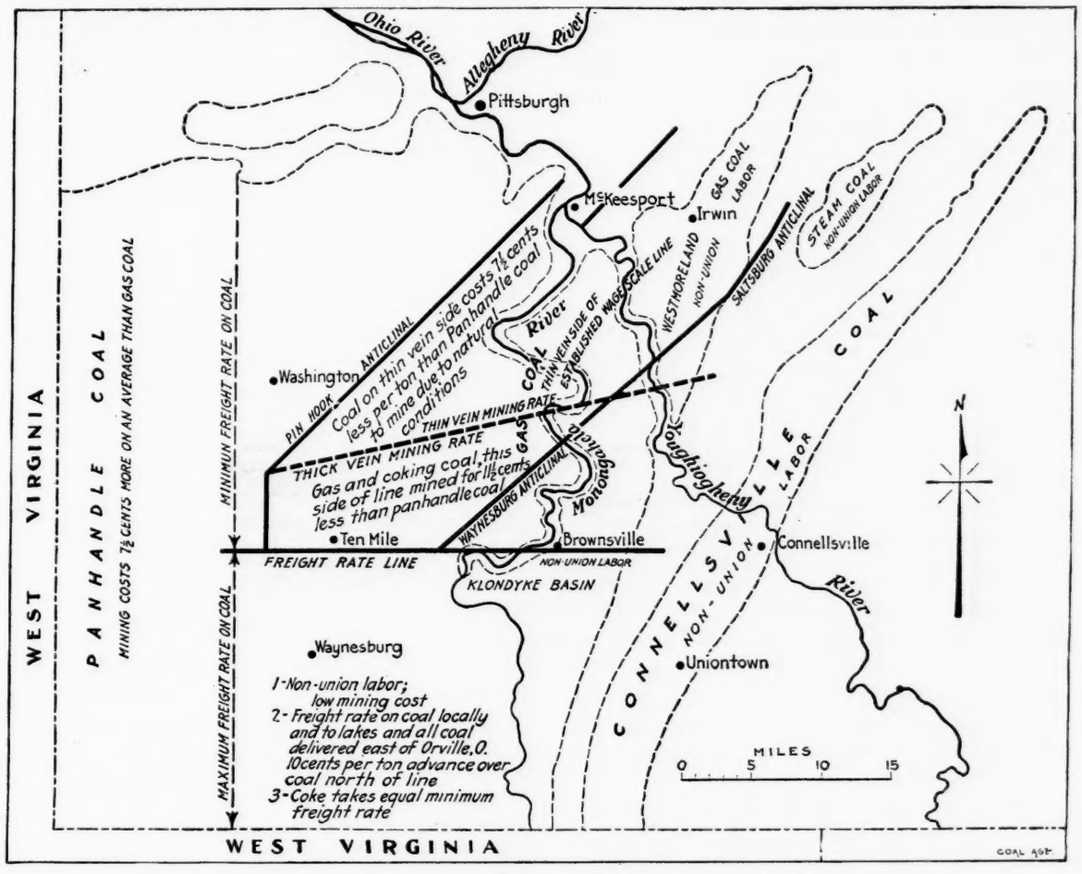


FIG. 2. SHOWING DIVISIONS IN COST OF MINING AND IN FREIGHT RATES

the acre, cost of mining and cost of transportation to market, must be considered.

IN BARELY A DECADE AND A HALF THE BEST CONNELLSVILLE BASIN COAL WILL BE EXHAUSTED

To measure the life of this coal field is an easy matter. In the Connellsville basin, the Lower Connellsville or Klondike basin, and other areas of coal east of the Monongahela River there are approximately 100,000 acres of the Pittsburgh seam available and unmined at this time. In 1912, I determined, from the assessor's books in each township comprised in the Connellsville and Lower Connellsville basins, the unmined acreage of coal and also the number of ovens attached to the properties. Thus my figures are based on the sworn statements of various owners of the coal lands and coke plants. I have added to these figures those published by the Connellsville *Courier*:

MERCHANT OVENS GOING OUT OF BLAST IN CONNELLSVILLE FIELD, DUE TO EXHAUSTED ACREAGE; ELIMINATING THE H. C. FRICK COKE CO.

	Old Basin	Klondike	Total
In next 3 years	2,575	1,310	3,885
In next 5 years	3,135	2,052	5,187
In next 10 years	4,691	3,814	8,505
In next 15 years	6,455	4,760	11,215

After 15 years there will be, of the present oven plants shown, 1039 ovens in the Old Basin, with 1653 acres of coal left. These ovens will have an average life of somewhat over 14 years. There will be 3842 ovens in the Klondike, with 5781 acres of coal left. These ovens can anticipate an average life of a little over 13 years.

NUMBER AND LIFE OF OVENS OF H. C. FRICK COKE CO. IN CONNELLSVILLE FIELD

	Tax List	Number of Ovens Connellsville "Courier"	Acres	Average Life, Years
Old Basin	15,491	14,199	23,896	14+
Klondike	4,182	3,664	14,271	31+

In addition to the above the H. C. Frick Coke Co. has 2935 acres in Redstone township, 1043 acres in Menallen township and 4423 acres in Luzerne township on which there are apparently no ovens. The coal from this property together with that from much acreage in adjoining townships will probably be shipped to byproduct ovens, making the total life of the Steel Corporation's coal lands in the Klondike district approximately 20 to 25 years, assuming that they draw on these lands to make up the decline in the Old Basin.

Gas-Coal Basin Will Be Depleted in a Few Years

It is clear from this accurate information that the original coking-coal fields of western Pennsylvania comprising these two basins of the Pittsburgh coal seam, which were thought to be inexhaustible a few years ago, have only a short life. More astounding than this, however, is the approaching end of the continued production of what is known as the Youghiogheny or Westmoreland gas coal, which comprises the coal in the gas-coal basin extending from Irwin on the main line of the Pennsylvania Railroad, east of Pittsburgh, in a southwest direction, crossing the Youghiogheny and Monongahela Rivers and extending into the northern end of Greene County. The coal from this basin has supplied probably 90 per cent. of the coal-gas illuminating plants in the United States up to the present time.

With the disuse of oil in gas making, steel heating and melting and in many other industries, the demand for this grade of coal will probably double within the next five years. Including the Westmoreland field and extending into the northern end of Greene County there is unmined and available in this basin approximately 150,000 acres. Because the southwestern portion of this basin makes a standard low-sulphur coke, various steel corporations have purchased large bodies of this land and there is now only available for the open market the product from about 70,000 acres of this coal.

The short life of the anthracite field is frequently matter for comment, but it can be shown that this particular grade of coal will be exhausted in one-seventh of the time necessary for the complete extraction of the anthracite coal in Pennsylvania, assuming that the peak of production in the anthracite field has been reached. The coal basin lying west and northwest of this between the Pinhook and Washington anticlinals will be called upon to supply the gas-coal from the Pittsburgh district when the gas-coal basin proper has been exhausted. In this discussion, however, all lands west of the Pinhook and Murraysville anticlinals are included under the name of "Panhandle" coal.

Fig. 1 shows the number of acres unmined in each subdistrict, the number of tons of recoverable coal per acre based on the past practice of the district in mining, and the divisions of quality in the district. Fig. 2 shows the divisions in the cost of mining and the freight-rate zones, both of which determine largely the values of the various lands of the district. Fig. 3 shows the estimated life of the various parts of the Pittsburgh coal field. The available and unmined coking-coal land may be divided into two parts, first, that containing coal running 1 per cent. of sulphur or under, and second, that underlaid by higher-sulphur coals.

This first includes the Connellsville basin, the greater part of the Klondike field and the eastern portion of Washington County east of the Pinhook anticlinal and southwest of Monongahela City, and the field in the northeastern portion of Greene County. The coking coal which has more than 1 per cent. of sulphur and which must be washed in order to make standard coke includes the upper portion of the Connellsville basin, the southern portion of the Klondike field and the southeastern portion of Greene County. The extreme thickness and large recovery of coal to the acre in the southeastern portion of Greene County and the low mining cost offset the expense incurred in washing.

The Pig-Iron Production Needs

An estimate of the pig-iron production tributary to this field up to October, 1912, was given recently in the *Iron Age* and a forecast was made showing the normal

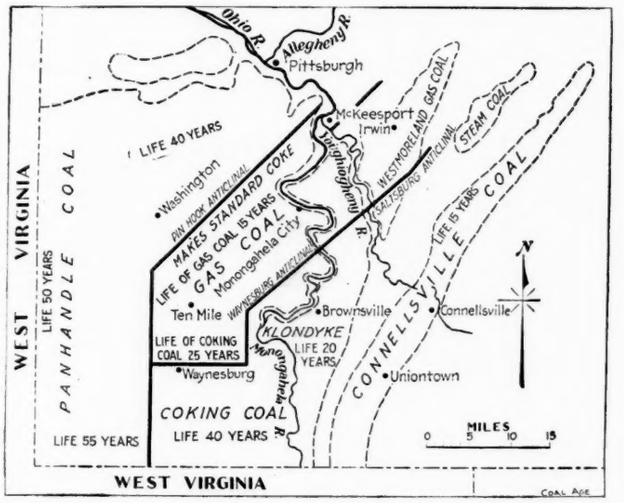


FIG. 3. ESTIMATED LIFE OF VARIOUS DIVISIONS OF PITTSBURGH COAL FIELD

The calculations are based on the equivalent of a 4 per cent. annual increase for 12½ years. After that time and until the coal is exhausted a uniform production is assumed, which is taken as 50 per cent. greater than the present normal output. The assumption is also made that the high-grade coals will be mined first. The present output of gas coal is 45 million tons per annum, coking coal 40 million and Panhandle 15 million. The annual increases assumed are: Gas coal, 1½ million tons for two years, coking coal 2 million tons till 70 millions is reached, and Panhandle coal a half million tons till the exhaustion of the field.

increase. This calculation is taken as a basis on which I have made an estimate of the life of the various fields of coking coal. I have assumed in this inquiry that the coal from the new fields will replace that from the Connellsville basin as its output declines and will also provide for the increased consumption of coke as the output of pig iron in the area tributary to these fields increases.

The average annual rate of increase of pig-iron production, based on figures for 1900 to 1910, was approximately 1,171,334 tons. For the next 10 years 1,400,000 tons may be assumed as the average flat rate of annual increase. The productions from 1912 to 1920 would, therefore, be as shown below. This forecast allows little for increase in population or increased use of iron per capita.

PROSPECTIVE PRODUCTION OF PIG IRON AND ANTICIPATED COKE NEEDS

Year	Average Pig Iron Production, Tons	Coke Required for Smelting, Tons*
1912	29,115,000	45,419,000
1913	30,515,000	47,603,000
1914	31,915,000	49,787,000
1915	33,315,000	51,971,000
1916	34,715,000	54,155,000
1917	36,115,000	56,339,000
1918	37,515,000	58,523,000
1919	38,915,000	60,707,000
1920	40,315,000	62,891,000

* The coke requirement is based on the assumption that 1.56 tons of coke will be used to smelt one ton of pig iron.

The following table shows: (1) That 75 to 80 per cent. of all the iron production of the United States is located tributary to the coking coal of the Pittsburgh district, and (2) the quantity of coke required by the different iron-producing districts. This is obtained by taking the pig-iron production of the United States for the last five years and the coke production for a like period. The pig-iron production of the United States from 1907 to 1911, inclusive, was 117,445,261 tons, and the coke production from 1907 to 1911, inclusive, was 183,388,466 tons. The coke required for blast furnaces, foundries, smelters, and gas production is 1.56 times that of the pig iron smelted.

DISTRIBUTION OF PIG IRON PRODUCTION AND COKE DEMAND

District	No. of Stacks		Month of October, 1912. Pig-Iron Production, Tons		Coke Required, Tons	
Buffalo, New York	16		179,726		280,372	
Rest of New York	2					
Pittsburgh district	51		621,813		970,028	
Eastern Pennsylvania (small stacks)	35		227,106		354,285	
Western Pennsylvania	18		157,027		244,962	
Shenango valley (Penn.)	16		143,115		223,259	
Mahoning (Penn.)	20		256,711		400,469	
Central and northern Ohio	21		237,506		370,509	
Wheeling district (Ohio and W. Va.	10		118,037		184,137	
	—	189	—	1,941,041	—	3,028,021
Chicago district (Mich., Wis. and Minn.)	38		442,091		689,661	
	—	38	—	442,091	—	689,661
Southern Ohio	9		38,419		59,933	
New Jersey	1		5,370		8,377	
Southern states	41		239,686		373,910	
Western states	3		23,326		36,390	
	—	54	—	306,801	—	478,610
		281		2,689,933		4,196,292

Analysis shows that the net demand on the Pittsburgh district by the different iron-producing plants is approximately 35,000,000 tons of coke per year. In making this estimate the whole iron production for October, 1912, of the states of Pennsylvania, New York and northern Ohio and one-half that of the Chicago and the northern Lake district are taken into consideration. This total equals 40,485,212 tons of coke and from it must be subtracted 4,136,000 tons of coke manufactured in byproduct-coke ovens in Pennsylvania, New York and Ohio, and also 1,000,000 tons of hard coal used in iron smelting in eastern Pennsylvania.

Using the foregoing forecast as a basis and assuming that the pig-iron production tributary to the Pittsburgh coal field will be maintained at the same percentage to that of the whole production of the country, the life of the various subdistricts of coking coal may be stated approximately as follows: Connellsville basin, 15 years; Lower Connellsville or Klondike, 20 years; eastern Washington County, 25 years, it being assumed that one-half of this coal will be used for smelting iron ore and the other half used for gas making, steel melting and other purposes. The 175,000 acres in eastern Greene County will have a life of 40 years.

Merging all the acreage together the life of the coking coal in the Pittsburgh district based on a normal increase in the use of this coal in the iron and steel industry and as a domestic fuel to replace hard coal will be approximately 40 years. It may be assumed that the present type of ovens will be largely replaced by byproduct oven plants on the field and at the point of manufacture.

The Money Value of Coal Purity

The Pittsburgh coal field has been so largely operated and the coals from the different subdistricts tested that it is not only possible to determine approximately the number of tons of recoverable coal per acre but the value of the land can be calculated based on the number of heat units delivered per pound of coal. The purest gas coal is prepared for market with about 6 per cent. of noncombustible matter. The Panhandle coal as it leaves the tipple has 10 per cent. of noncombustible matter. The average difference in the ash of the two coals is therefore 4 per cent.

The average delivered cost of a ton of Pittsburgh coal, including freight rates, approximates $2.50. The lowest delivered cost in the Pittsburgh district is about $1.50 per ton. Coal shipped by way of the Great Lakes and into Canada and the West is delivered to the consumer at from $3.50 to $4.50 per ton; the average price, giving due weight to the tonnage, is approximately $2.50.

A difference of 4 per cent. in heat value on a basis of $2.50 delivered cost per ton shows a difference in delivered money value of 10c. per ton in favor of gas coal, and reduced to an acreage basis is equivalent to an excess value of between $800 and $900 an acre. As has been stated before, the gas coal merges gradually from the Pinhook anticlinal westward into Panhandle coal and there are points and locations immediately west of the gas-coal basin where the difference in value of heat units per pound of coal delivered would be much less than the average difference.

The value of any coal depends on the use to which it is put and the advantage of its use over other competitive coals in any special industry can be figured in cents per ton and therefore in dollars per acre of coal land. It has been stated by managers of illuminating-gas plants that the Pittsburgh gas-coal product has an ultimate excess value of 25 to 30c. per ton of coal over gas coals from other districts.

An Even Greater Premium on Purity When Ash Is Deleterious

The coking coal of the Pittsburgh seam in western Pennsylvania, because of physical and chemical properties, geographical location and freight rates, controls approximately 80 per cent. of the coke demand of the United States and Canada. Judge Gary, of the United States Steel Corporation, is credited with a public statement placing $2000 an acre as the value of coking coal from the Pittsburgh seam in western Pennsylvania. This checks up with a statement made to me by one of the Pig Iron Committee of a large steel corporation to the effect that a coke with the best physical structure containing 1 per cent. or less of sulphur is worth about 30c. a ton more in the manufacture of pig iron than a coke having a higher percentage of sulphur, for, in that event, additional coke and flux must be placed in the furnace in order to remove the surplus sulphur.

The Competition with Southern Illinois Coals

The geographical value of the Pittsburgh coking coal based on freight rates to distant markets has not been

fully grasped either by the steel companies or the public. For byproduct-coke making or gas making along the Great Lakes, at any point, it is possible to ship low-sulphur Pittsburgh coking coal to the lake front for a delivered freight cost placed on board vessel of 83c. a ton. The vessel rate from Lake Erie ports to any point on the Great Lakes ranges from 25 to 35c. a ton, making a total freight rate to Lake Superior points of $1.13 and to Lake Michigan points of $1.18 per ton.

The minimum railroad freight rate on coal from West Virginia and Kentucky to Chicago or Lake Michigan points is $1.90 per ton. A freight rate from southern Illinois based on about 3 mills per ton-mile would be $1.05 per ton to Gary, Ind. Coal shipped from the Pittsburgh coal field via lake to Lake Michigan points therefore shuts out all West Virginia and Kentucky coals by rail and can be put into the storage yard at the byproduct coke-oven plant in the Chicago district along the lake front (based on available carbon per unit of pig iron produced) at about an equal cost with southern Illinois coal.

According to a paper on Illinois coals,* the Franklin County coal contains from 18 to 21 per cent. of noncombustible matter as against the 6 to 7 per cent. found in Pittsburgh byproduct coal. I believe that recent developments indicate that these analyses of southern Illinois coals are too high in noncombustible matter, but taking this coal as now loaded into the railroad cars, 16 per cent. may be assumed as noncombustible matter, divided approximately into 9 per cent. ash and 7 per cent. water, or 10 per cent. ash and 6 per cent. water.

Freights Being Equal, Quality Will Determine the Issue

There would, of course, be certain losses in heat units in the coking of southern Illinois coal on account of the water that could not be charged to Pittsburgh coal, and excess sulphur in Illinois coal would also reduce the amount of available carbon per unit in the blast furnace. The foregoing facts when taken in connection with the superior coking qualities of Pittsburgh coking coal would indicate that southern Illinois coal for byproduct use in the Chicago district would not be as cheap ultimately as Pittsburgh coal shipped there by lake, based on equal cost of coal at the mines. A careful study of the situation indicates also that the pig-iron furnaces bordering on the Great Lakes, almost all the furnaces in northern and central Ohio, western Pennsylvania, furnaces in New York State, a large percentage of the furnaces in eastern Pennsylvania, and those in Canada will draw their fuel supply from the Pittsburgh coal field. As that industry increases in volume, the coal production will have to increase in the Pittsburgh coking-coal field and the life of the field will be shortened accordingly.

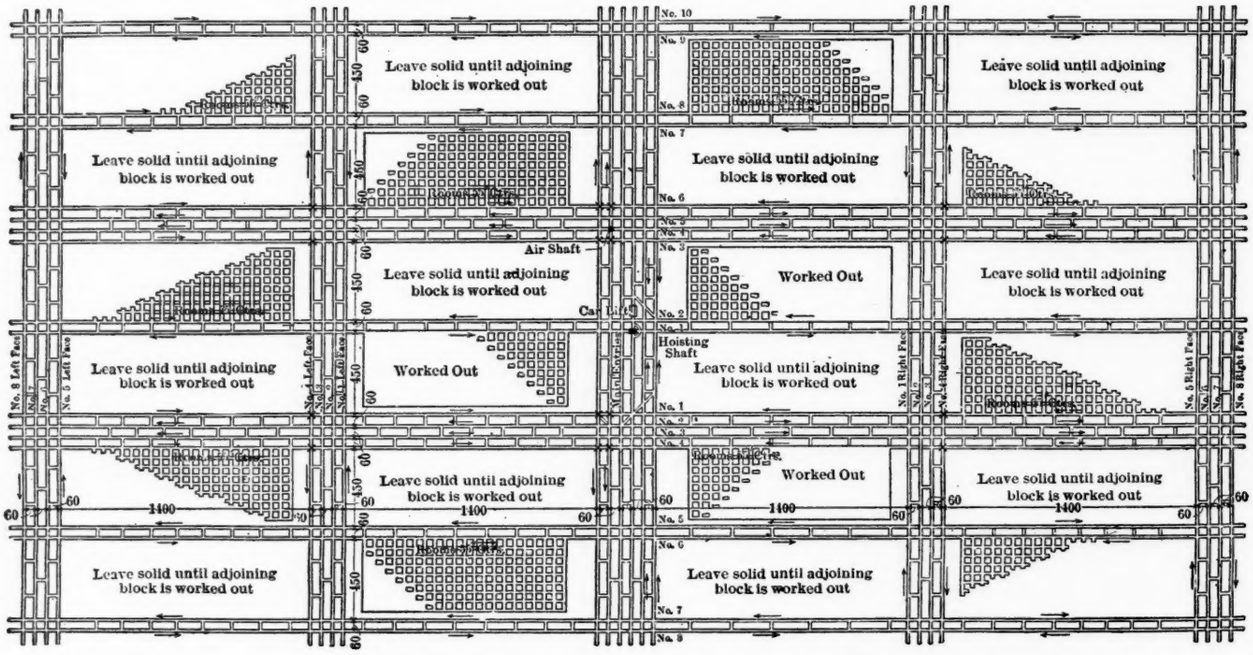


Fig. 4. Plan of Mining for Extraction of Coal by Mechanical Means

Wage-Scale Partition Line

The cost of mining is another factor governing the value of the coal and the length of life of the various areas of the Pittsburgh coal field (see Fig. 2).

The Union scale of wages divides the Pittsburgh field into two parts (known locally as the thin- and thick-vein mining-scale districts), the dividing line running from Port Royal on the Youghiogheny River west through Lock 4 on the Monongahela River, and extending still farther west through a point north of Bentleyville, Washington County. The coal north of this line has the thin-vein wage scale, which when reduced to a run-of-mine basis is 7c. per ton more than that obtaining south of this line. This, however, is not a true measure of the cost of mining coal in this district, as the natural conditions in various parts of the field modify the cost of extraction.

*Transactions of the American Institute of Mining Engineers, Vol. XL, p. 4 (1909).

The Pittsburgh Coal Co. made sworn statements before the Interstate Commerce Commission at Washington on the cost of mining 18,000,000 tons of coal from Apr. 1, 1910, to Aug. 31, 1911, as follows:

COST OF MINING PITTSBURGH COAL

	Production, Tons	Average Cost Mine-run Coal.*
Panhandle coal	8,174,880	$1.0434
Gas coal	5,070,600	0.9686
Thick-vein coal (coal south of wage-scale line)	5,052,887	0.9283

*Does not include interest or dividends.

Coal Land Worth $2000 per Acre

Because the tonnage is extremely large and covers a long period of time, and because the same accounting system was applied to the whole tonnage, and in like manner to each district, the statement is an accurate measure of the cost of mining Pittsburgh coal in the various subdistricts of the field, and for purposes of current operation places an accurate value on the land in the different districts. It will be seen that the fuel from the gas coal area in Fig. 2 was produced on board railroad cars for practically 7½c. per ton less than Panhandle coal. Reduced to an acreage basis this indicates that for current operating purposes gas coal costs $600 to $700 an acre less to mine than that classed as Panhandle. As a fuel for generating steam it has been noted before that it is actually worth, at a delivered cost price of $2.50 a ton, 10c. per ton more to the consumer, which makes its excess value above that of the average Panhandle coal about $1400 an acre, assuming that the consumer is willing to pay for the coal based on the heat units delivered.

The thick-vein coal was mined for 11½c. a ton less than the Panhandle fuel, or $1000 an acre. As a large part of this thick-vein coal is used for coke and gas manufacture, its value, based on delivered results, is almost equal to that placed on coking coal by Judge Gary, if we assume the average Panhandle coal as having a value between $200 and $300 per acre.

Profits Were Derived from Gas Coal

Another light may be thrown on the value of Pittsburgh coal lands by the sworn testimony of the Pittsburgh Coal Co. before the Interstate Commerce Commission involving the same period of time, by combining the foregoing statement with Comptroller Hornberger's Exhibit No. 5. That declaration before the court declares the average market value of all grades of run-of-mine coal at the mine for lake shipment during 1910 was $1.0708. If we assume that all three grades of coal were sold at the same prices, though the Panhandle coal is not of equal quality with the others, then the 8,174,800 tons of Panhandle coal earned the Pittsburgh Coal Co. $224,000 and the 10,123,487 tons of gas coal and thick-vein gas and coking coals earned this company approximately $1,338,000. But if the Panhandle coal secured only an inferior price, all the profits must have been made out of gas coal and the adjoining thick-vein gas and coking coal.

How the Freight Rate Aids

With all these accurate data in hand, it is easy to place relative values on the different parts of the Pittsburgh coal field. On comparing this district with those of West Virginia and Kentucky, we find that the excess freight rate now charged on coal from the Fairmont district in West Virginia to the lake front is 12c. per ton, and the same seam of coal is mined.

The charge for conveying coal from the Kanawha district and from West Virginia and Kentucky to the lake front is everywhere at least 19c. per ton higher than from this district. As compared with all-rail shipments as far west as Chicago, the freight rate on West Virginia and Kentucky coals lying nearest to Chicago is the same as the Pittsburgh rate, but by the way of the lake, the Pittsburgh field has an advantage of 12 to 19c. per ton over these coals, together with a higher market value based on delivered results.

The movement toward freight-rate adjustment will add additional value to the Pittsburgh coal field in western Pennsylvania. The certain failure of the railroads should they attempt to override the geographical disadvantage is illustrated by the misfortunes of the Cincinnati, Hamilton & Dayton R.R. when it sought to haul coal to the lake front for approximately 2 mills per ton-mile, as compared with the 5 mills paid by Pittsburgh coal.

It is reasonable to believe that changes in freight rates from the Pittsburgh district will be reductions, and that advances will be made in the tariffs from southern West Virginia and Kentucky, in order to maintain the solvency of the railroads which carry the coal. The Interstate Commerce Commission will find it necessary to fix the freight rates more nearly on the basis of cost of transportation, in order to maintain the solvency of the railroads themselves and to conserve the natural resources

Fig. 5. Advancing Plan Fig. 6. Retreating Plan

of the country; all of which will tend to conserve the Pittsburgh coal field and probably extend its life over the estimates made.

The Poor Mining Methods of the Past

It may be stated that the Pittsburgh coal areas already worked over have up to the present only shown a recovery of 60 to 65 per cent. of the coal in the ground, though the Connellsville field has shown a better conservation.

In the old days of mining only the breast coal was saved and only cheaply extracted portions of this bench were hauled to the tipple. In recent years the more modern operations in the Pittsburgh district have adopted systems of extraction which permit a recovery of 85 per cent. and in some cases 90 per cent. is secured, but this percentage of recovery only represents the work of the last few years and only a portion of the district.

The Railroads Tried to Handicap Competing Districts

The destruction of the Pittsburgh coal seam in past mining operations in this district was made necessary by the fact that the railroads placed an extremely high freight rate on coal shipped, in order to divide the market with Southern railroads. The result

was that with nonunion labor and extremely high freight rates per ton-mile from the Pittsburgh district, and extremely low freight rates from West Virginia and Kentucky, it has been possible for operators in the Southern fields, to a limited extent, to enter markets which naturally belong to the Pittsburgh coal field.

It is obvious that it is bad public policy to permit the issue of railroad securities for transportation equipment, the effect of which is to destroy natural resources in the Appalachian coal fields, in order to secure an unnatural coal market for a distant coal field, and to increase the gross business of a railroad at no profit to the stockholders. As stated before, the present condition of the Cincinnati, Hamilton & Dayton R.R. illustrates the fallacy of this policy. The resources of the Pittsburgh coal field and those of the United States cannot be conserved unless the cost of service on railroads is a measure of freight rate. With gradual adjustments made in freight rates to cure this evil it may be assumed, basing our conclusions on present mining practices, that 90 to 94 per cent. of the Pittsburgh coal measures may be recovered.

The Connellsville field proper, under the supervision of Thomas Lynch, president of the H. C. Frick Coke Co., has employed methods in mining which are the most efficient in the United States. The recovery of coal in the Connellsville field through the system established by Mr. Lynch is about 93 to 94 per cent. The operations in this field from the standpoint of percentage of recovery, safety measures provided for guarding against death and accidents to miners, and improved living conditions around the mines, are an example for all coal-mining operations of the country. If the remainder of the Pittsburgh coal field, through adjustment in freight rates and mining costs, would adopt a modified system of the Connellsville plan of extraction, the life of the Pittsburgh coal field would be increased materially and the wealth of the district proportionately.

The Anticipated Improvement of Mining Systems

I have in a period of 10 or 15 years developed a system of mechanical mining to be applied to a modified system of extraction as practiced in the Connellsville field by the H. C. Frick Coke Co. (Figs. 4 to 5). After spending much time and money in this period of time, machines and methods were produced which have apparently reached a stage of perfection. Several of these machines have operated continuously for many months in the Pittsburgh coal field with small repairs and without any delays in operation. The results are so convincing that it can be announced without reservation that mechanical mining is established and that by means of machines now perfected and operating daily, and by adopting the modified plan of extraction equivalent to the methods in the Connellsville field, these results may be secured:

1. That 90 to 95 per cent. of the coal measure may be recovered mechanically.
2. That the cost of mining in thick seams averaging over 5 ft. will be reduced from one-third to one-half.
3. That one man operating the new machine, and using the methods now perfected and working, will be able to produce as much coal as four to six men produce under the present methods by the use of the existing machinery.

With all this in view the future of the Pittsburgh coal field is extremely bright and the wealth of the district is increased largely. It may be stated that the present beehive ovens or open ovens of the district will be used to exhaust areas of coal lands adjacent, but that future coke plants supplying the iron and steel industry tributary to this coal field will, to a large extent, be the retort type of oven with byproduct recovery. Some of these plants will be placed at the point where the iron and steel are manufactured and other plants will be placed in the coal field.

Why Most of the Pittsburgh Coal Will Be Coked in the District

The Pittsburgh district will face in a few years the total exhaustion of natural gas, or at least a large reduction in the supply. There are established throughout the district, and crossing the coal field, many large pipe lines which are now used as natural-gas mains. It is obvious that these mains may be used for piping retort-oven gas to various industries for industrial purposes and to the cities for domestic use. It is also obvious, since the anthracite field has approximately reached its peak of production, that small coke made at byproduct ovens will be used more and more to replace hard coal west of a line north and south running through Buffalo.

It is my opinion that the majority of the retort-oven plants will be placed in the coal field as the pipe lines are already established and as byproducts such as tar, ammonia and benzol may be shipped from the Pittsburgh district with as much economy as from practically any other point. Freight rates throughout the country have been established so that the cost of transporting a ton of coke to market from the Pittsburgh district is about equivalent to transporting 1½ tons of coal. This makes it possible to ship coke to the various points as cheaply as the coal necessary to make a ton of coke, so that there is no transportation advantage in shipping coal to a distant point to make byproduct coke.

The modern construction of railroad-coke equipment has reached a stage that enables the railroads now to haul a train of coke as cheaply as a train of coal of the same weight, the difference, if any, being slight. The tendency, therefore, will be to adjust coke freight rates on the basis of cost of transportation, which will be in favor of establishing coke plants in the Pittsburgh coal field.

With this adjustment in view, it would be more profitable to establish the byproduct-coke plants in the coal field, especially if the gas could be sold to the pipe lines now established. Or if the railroad lines are largely equipped for electric traction, it may be that it will pay to put the byproduct-coke plants in the coal field and by the installation of gas engines at the coke plants generate electric power which can be transmitted and sold to the railroads at low prices. The question of where to establish the byproduct-coke plant will be given an answer depending largely on whether the owner of the coke plant uses his own products or manufactures for the general market. It would seem, however, that a commercial coke plant would have a larger sale both for gas and coke if established in the Pittsburgh coal field than if placed elsewhere, as the established freight rates on coke would allow shipments to any point now available, and the local market for gas would absorb at fair prices the surplus gas of the plant.

The Labor Situation

SYNOPSIS—The orders of the War Office to the operators in Colorado reflect the probable action of the government in that state and in Arkansas. Troops have been dispatched to Hartford, Ark., to support the U. S. Circuit Court. In eastern Ohio the situation is unchanged.

It is important to operators everywhere to know just what action the government will take in mine disputes. Both Roosevelt and Wilson have been disposed to stretch the Presidential authority in the most autocratic fashion, and the War Office orders we now print will convince our readers that the editorial entitled "The Mailed Fist," in our issue of Aug. 29, was well justified.

Forbidding the Employment of New Men

Headquarters U. S. Forces,
Louisville, Colo., May 19, 1914.

Official in Charge,
Baum Mine.

Sir:

In view of conditions in this district, it is considered very undesirable, under existing conditions, to introduce any new labor into this district, or open up any mines which were not running just prior to the arrival of the federal troops in the Boulder-Louisville mining district.

New men entering the district should not be given employment, as such action would not be complying with the President's proclamation requiring all "to retire to their respective abodes."

Our first duty here is to enforce obedience to the law and restore conditions of peace and good order. In doing this, we are not justified in allowing new men to come into the district until conditions assume a more normal aspect and something approaching a settled condition has prevailed for a sufficient length of time to make it wise to do so.

You will therefore communicate this information to the proper officials of your mine.

Very respectfully,
CHAS. J. SYMMOND,
Major 12th U. S. Cavalry,
Commanding U. S. Forces.

War Office Eases Rule in Favor of Unsolicited Labor

Camp of U. S. Troops,
Frederick, Weld County, Colo., May 29, 1914.

The Official in Charge,
Baum Mine.

Sir:

In case of unsolicited applications for employment at your mine by men desiring to fill vacancies existing, caused by men voluntarily leaving, the employment of these men, under the conditions mentioned, will be approved, unless some special reason is known not to do so.

Men so employed must be promptly entered on the daily report, and in case their employment is not approved, notification will be sent you at once.

Very respectfully,
H. J. McKENNEY,
Captain 12th U. S. Cavalry,
Commanding Frederick District.

The War Office Requires All "Recently Hired" Men Not Citizens Be Discharged

Headquarters U. S. Forces,
Boulder-Louisville District, Aug. 17, 1914.

From: The Commanding Officer.
To: Baum-Consolidated Coal & Coke Co.
Subject: Employment of labor.

In compliance with instructions from the War Department, dated Aug. 14, 1914, the following regulations on the employment of labor will be enforced in this district. Laborers recently hired who do not conform to these regulations will be discharged:

1. Miners must seek work at the mines.
2. Miners must not be gathered and brought in by operators.
3. Miners must be citizens of the state of Colorado.
4. Miners must have complied with the laws of Colorado which relate to miners.

J. WATERMAN,
Lieut.-Col., 12th Cavalry,
Commanding U. S. Forces.

A Request for an Explanation

Aug. 19, 1914.

Capt. H. J. McKinney,
Troop I, 12th Cavalry, U. S. Army.

Dear Sir:

In order to obtain a clearer understanding of the last labor regulations you have issued, dated Aug. 17, 1914, we would like to have your decision upon the meaning of several things therein that are not now quite plain to us.

Does this regulation apply to merely "miners," as it states, or to all employees about a coal mine? A miner, as understood by us, is the actual coal digger—the man who shoots and loads the coal at the working face. This is generally so understood in all coal-mining practice.

I wish particularly to inquire, in this regard, what we are expected to do about the skilled labor, or craftsmen, who are so necessary to the operation of this mine and its machinery, and who, as a class, almost never apply at the mine in person for employment. This would include the following men: Mining engineers, draftsmen, helpers; office and supply clerks; master mechanics and electricians; shopmen—skilled laborers, such as blacksmiths and carpenters; hoisting engineers; firemen; foremen and bosses; certificate men—such as pit boss, firebosses, shot inspectors, etc., who are required by state law, and must have a state certificate of competency; pumpers and pipemen; weigh bosses, employed by the railroad weighing association; machine runners (skilled labor).

In regard to article 3, which requires that "miners be citizens of the state of Colorado," I beg to state to you that, if interpreted literally, it will practically close down this property. About 5 per cent. of our usual winter's operating force are Colorado citizens, and only about 20 per cent. citizens of the United States. Even restricting the employing of applicants to those who are **residents** of this state will more seriously handicap the operation of this mine than any of the regulations heretofore required.

Our intention is at all times to exactly comply with all rules and desires of the War Department regarding us. We are not evading these rules now, nor will we under any circumstances, even if we are seriously curtailed in our normal output this winter over what we have enjoyed for the last several years.

Therefore, we ask particularly about these points that we do not at present thoroughly understand.

Yours very truly,
C. W. SMITT,
Mine Superintendent.

The War Office Again Backs Down, But Is Still Unreasonable

Headquarters U. S. Troops,
Boulder and Louisville District.
Date, Aug. 22, 1914.

From: The Commanding Officer.
To: Baum.
Subject: Employment of labor.

In conformity with further instructions received from the War Department, dated Aug. 20, 1914, the following modifications are made in the circular letter to the mines, dated Aug. 17, 1914:

1. The word "miners" as used in the circular letter is construed to mean all employees of the mines.
2. Mines may retain all employees on their rolls Aug. 23, 1914, if employment complied with 1 and 2 of circular letter of Aug. 17, 1914.
3. One year's residence in the state of Colorado will be required of all employees hired after Aug. 23, 1914. Citizenship will not be required.

J. MALINE,
Lieut.-Col., 12th Cavalry,
Commanding U. S. Forces.

What Will Happen if Troops Retire

The miners seem to have made up their minds to resist the militia should it take the place of the U. S. troops and perhaps prospects of certain bloodshed following a withdrawal of his forces has made the President halt in his plans. J. F. Welborn states that:

At a meeting at Trinidad, Oct. 28, two organizers advised the men that it had been decided to drill the strikers and get ready for the militia. Within the last ten days an officer of the United Mine Workers of America, who is one of the leaders in the Trinidad district, stated in effect to a federal army officer that as soon as the federal troops are withdrawn the strikers will attack the state militia if recalled into the field, and will also destroy the property of the mining companies. He stated that in preparation for such an event union men in the neighboring states to the number of 3000 have been organized, drilled and armed and are in readiness to move when called on.

Is the Militia Entering the Coal Field?

On the other hand the U. M. W. of A. officials declare that armed militiamen are entering the mining district so as to be ready to protect the lives, liberties and property of the operators should the U. S. army be removed. But the officials do not so word their declaration. A message, stating that 14 militiamen in charge of Dr. Curry of the Victor-American Fuel Co., had been introduced into the coal field and condemning their intrusion as intended to incite trouble, was sent to the President on Oct. 21 by F. J. Hayes, J. R. Lawson, J. McLennan and E. L. Doyle, the policy committee of the strikers.

Mine Closed Down

The troops are still interfering with operation. The Jeffryes' mine at Starkville was shut down, according to one report, by U. S. troops because it had been opened without permission. A sergeant of the U. S. Army ordered the mine closed. Jeffryes refused and the sergeant returned to camp for four troopers and returning compelled the closing of the mine. The operation is run by the Jeffrye Coal & Mining Co. Our records show that the corporation produced 18,394 tons in 1910 and 24,214 tons in 1911 corresponding to daily tonnages of about 90 and 120 tons respectively. The government will soon interfere if John Smith, groceryman, hires a new clerk.

The Activities of the Militia on Behalf of Union

"Muckie" McDonald, the president of the Butte Mine Workers' Union; Joseph Bradley, the vice-president; Thomas S. Coyle and Mrs. Florence Gillis have been arrested. The first two are charged with deporting a miner, Edward O'Brien. The others were held pending investigation. McDonald is discovering that deportation of a union man is a crime of first magnitude in Montana, whereas in Colorado it is hard to secure conviction of a man for wilful murder, so uncertain is the administration of justice in union-ridden states. Still, McDonald may take comfort as he has been apparently mixed in even less creditable ventures than the one which is directly the cause of his arrest, namely, the seizing of 37 Federation men at the shaft mouth.

Sheriff Timothy Driscoll and Mayor Lewis J. Duncan have been found guilty of neglect in connection with the Butte riots by Judge Roy E. Ayres, of the district court. This is the sad fate of these socialist authorities. However, Butte still has a socialist in control, Clarence A. Smith, the president of the city council.

The Arkansas Situation

It will be remembered that on Apr. 4, the Bache-Denman mines commenced to operate on the "open shop" basis. There was constant disorder, as Arkansas is a strong union state. The company got an injunction from Frank Youmans, the U. S. district attorney, prohibiting interference with the operation of the mines. Franklin Bache was later appointed receiver. On July 17 and following days, when the mines were still under the authority of the court, the guards and miners were driven away, the tipples of five mines were burned, and two employees of the company were killed and their bodies cremated.

Judge Youmans asked for the assistance of the U. S. War Department. Until recently, the government has apparently been actively interfering with order, having required, it is said, the discharge of U. S. marshals, who before the burning of the tipples were guarding the property under the authority of the court. However, Lindley M. Garrison, Secretary of War and President pro tem, in the absence of Woodrow Wilson, issued an order for four companies of the Fifth Infantry to proceed from Fort Sheridan, Ill., to Fort Smith, Ark., to enforce the orders of the federal court. The commandant is Maj. Nathaniel F. McClure. Four miners have surrendered to the federal forces and perfect order prevails.

The Secretary of War says, relative to this action:

We have reached the conclusion that it is impracticable to enforce the law and the orders of the United States Court in Arkansas by any other means. The court had appointed a receiver for the coal mines; the mines had been blown up and the men who had been arrested charged with the crime had been forcibly released from the custody of the U. S. marshal by their friends. The U. S. court had been unable to enforce its processes.

The troops will not undertake to serve any processes; they will confine themselves to making it possible for the civil officers to perform their functions.

Immediate Reason for Action

On Oct. 28 members of a mob fired on two U. S. deputy marshals and on nonunion employees of Prairie Creek Mine No. 3, and burned eight unoccupied houses belonging to the Bache-Denman Coal Co. On the 31st they took government prisoners from Deputy Marshal Black. On the 5th of November six more houses were burned including a boarding house which had been designated as headquarters for the officers of the U. S. Cavalry force on its way to enforce the orders of the U. S. court.

It is said that the United States has not taken action since 1894 except on request of state authorities. At that time troops were sent by Grover Cleveland to Chicago to prevent the interference with U. S. mails and interstate commerce.

The Eastern Ohio Strike

No change is perceptible in eastern Ohio. Much political capital was made by Republicans out of the Mine-Run Law. The Democrats were urging its passage as a reason for continuing them in office. The Republicans urge that the bill was framed without any intention of ousting screens, showing that under its provisions the miners could still receive a lower price for slack than for lump coal; so low, in fact, might be the price paid for slack that the law would be practically inoperative. One of the propositions of the operators, it will be remembered, was to pay 2c. per ton for slack and 99c. for lump coal.

The case of the Rail and River Coal Co. against the Industrial Commission of Ohio, regarding the constitutionality of the Mine-Run Law is set for Nov. 30. Assistant Attorney-General Laylin filed a motion to dismiss the case. Chief Justice White announced the dismissal on Oct. 26 but finally granted an order for an argument of the case as stated Nov. 30.

Kentucky Workmen's Compensation Law

The validity of the Workmen's Compensation Law of Kentucky, enacted by the last legislature, was recently threshed out in court for the first time at Frankfort. It was argued that the law makes the administering board a judicial body, that it takes away the due process of law by practically coercing employers and employees into an agreement to arbitrate; that it does not allow sufficient compensation, and that it undertakes to bind the administrators of persons killed in industrial accidents as to the amount of recovery.

All these contentions are denied by the state, which maintains that the board has powers of arbitration only, and that the law applies only to those who elect to accept its terms; that the benefits stipulated are greatly in excess of the average amounts recovered in suits, and that a majority of industrial accidents are of a nature to deny recovery in the courts. The provision relating to administrators does not involve the validity of the law, it is declared, and may be left until some administrator brings suit under it.

The case was argued before Judge Stout, and an appeal will be taken from his opinion to the court of appeals, which will rule finally as to the constitutionality of the law. The compensation provisions become effective on the first of the year.

Illinois Problems

The three coal operators' associations in Illinois, known respectively as the Illinois Coal Operators' Association, the Central Illinois Coal Operators' Association and the Fifth and Ninth districts organization, agreed in the spring with the miners that they would appoint conjointly an arbitrator who would represent them. Edwin T. Bent, of Chicago, has met with the approval of the Illinois Coal Operators' Association and that of the coal operators of the Fifth and Ninth districts. Those in the Central Illinois Association refuse to indorse him, preferring George Wood, of the Chicago-Springfield Coal Co.

The Illinois Mine Workers have chosen John H. Davis, of Herrin, Ill., vice-president of the Seventh Subdistrict, as their representative on the arbitration board, and it is the intention of both parties to arbitrate under the agreement ignoring the Central Illinois operators, who will settle their difficulties in the old manner through the subdistrict and state executive boards.

Articles for Next Week

The Nov. 21 issue of COAL AGE will contain a number of articles sure to be of interest to all our readers. First there will be a detailed description of the new Loomis colliery just being completed by the Delaware, Lackawanna & Western R.R. Co. at Nanticoke, Penn. This plant is the last word in anthracite construction. Several articles intended for this week's paper were crowded out and will appear next week. One of these describes "A Modern English Mine-Rescue Station." A second article deals with the subject "Coal Waste in Mining Plants." Other articles will describe "A New Briquetting Plant," "Colliery Lubrication" and "Machine Mining in Pitching Seams."

Extracts from a Superintendent's Diary

Every payday we are reminded that we are not entirely separated from the outside world.

Early in the morning, collectors from near-by cities begin to arrive and throughout the day they wind about the streets of our village interviewing their clients wherever they chance upon them.

Installment furniture men, crayon-portrait solicitors, sewing-machine agents, phonograph agents, mail-order tailors, piano and organ demonstrators, all are present.

Time was when I looked upon solicitors of this class as parasites, and on more than one occasion, I have heaped insult upon some of them and then worked myself into a fury because they refused to be drawn into argument.

I first began to see things in a different light several years ago. We had a widow living in the camp who supported herself and a young daughter principally by taking in washing. Now the washing industry, like all other industries, strange though it may seem, has periods of depression, and it was during one of these hard-time periods (the miners of the camp were only working half time, and most of their women folk were counting their nickels and the dimes pretty closely) that the widow's financial affairs got beyond her control. I was appealed to and found that the straw that seemed to have broken the camel's back was a phonograph bought on the weekly installment plan.

I paid a visit to the phonograph salesroom and proceeded to tell the manager what I thought about him and his business methods. The widow had paid in one-third of the price of the instrument and the dealer agreed to take back the phonograph and cancel the obligation. Then to encourage the widow, I gave her a check equal to the amount she had already paid on the phonograph.

The lady who had first mentioned the widow's plight to me assured me that this would enable the widow to reestablish herself on a self-supporting basis.

But it transpired that my lady informant and I reckoned without full knowledge of the hankerings and aspirations of the widow in question.

What did the widow do but go to the phonograph company and pay them the check that I had made out to her. This payment with the amount previously paid in installments left only a balance due on the phonograph of one-third of the purchase price. They agreed to give her as much time as she might desire on this balance.

I decided then and there that phonographs meant more to some people than I had imagined, and a little investigation convinced me that in many cases things bought on the installment plan, although often purchased at outrageously high prices, brought cheer and pleasure, which far outweighed their purchase price, even measured in terms of sacrifice and self-denial.

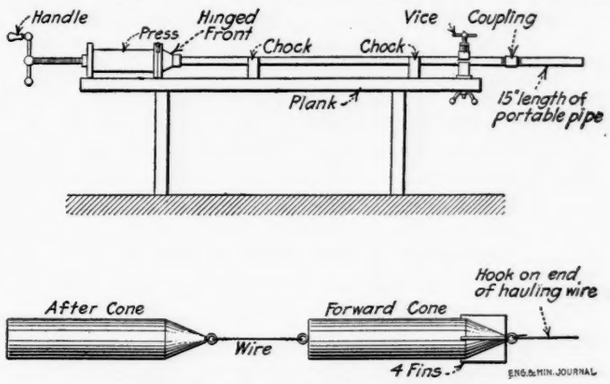
And now as I look back at my arbitrary high-handed rulings in the past in dealing with the installment men, I fail to find justification for my actions, even admitting that the purchasers could have gotten along without the things purchased.

Its pretty easy to justify offhand most any action taken on behalf of the weak and lowly, because the argument is always based on a lot of assumptions that we consider self-evident. They are self-evident only because we do not take the trouble to investigate closely. And it is quite possible that many of the misunderstandings around our diggings, and other people's diggings as well, could be traced back to ill-advised interference with everyday affairs of the humble, on the part of well meaning higher-ups.

Lining Pipe with Cement

Cement-lined wrought-iron pipes, because of their freedom from interior corrosion and stoppage, have been used for water service to some extent for many years. Recently, a company has been organized in Boston to line pipe on order, either taking pipe supplied to it or furnishing the pipe itself. This fact is of interest on account of the possible application of the cement-lined pipe to mine uses. The procedure in lining the pipe is described in *Engineering News,* Oct. 8, as follows:

A screw-piston press, 5 in. in diameter and about 18 in. long, mounted on one end of an 18-ft. plank, is used to force the mortar into the pipe. The forward head of the press cylinder is hinged to swing open; it has a central hole threaded for 2-in. pipe (other sizes are accommodated by use of bushings). The cylinder head is swung



APPARATUS USED IN LINING PIPES

open, the cylinder filled with mortar, and the head closed and locked. The pipe to be lined is then screwed into the hole in the cylinder head. By forcing the piston ahead, the cement is then shoved out into the pipe. After this the pipe is unscrewed and moved along into a vise at the front end of the plank. A coupling is set up on the forward end, with a portable length of pipe about 15 in. long screwed into it as far as another pipe would be fitted, usually about six threads; this keeps the threads clear of mortar for connecting one length of pipe to another.

A stiff wire is now pushed through the cement in the pipe, from the front end, and a pair of tapered mandrels pulled through the pipe by means of this wire, to core out the bore of the pipe. The mandrels are short lengths of brass pipe with tapered front end, fastened together by a loose wire. The outside diameter of the mandrels is ¼ in. less than the inside diameter of the pipe. The forward mandrel has four longitudinal fins, at 90° intervals, to center it in the pipe, while the rear mandrel is smooth and, following through the bore made by the first mandrel, finishes it to shape and surface. The result is a smooth ⅛-in. lining of cement mortar.

After inspection, the pipe is laid away for the mortar to harden. The short length of pipe at the point is unscrewed, but the coupling is left on. All tees, elbows and other fittings are also lined with cement mortar, giving a smooth and continuous interior surface.

Editorials

Alaska

The Mine Inspector for the Territory of Alaska in a recent report dismisses coal mining in that section of the United States in a few brief words. His reference is necessarily as short as one which might have been penned by a British governor relative to the iron industry in the American colonies when his Britannic majesty was disposed to believe that dependencies should not enter the mechanic industries and should be discouraged. He says:

> Coal mining has not received much attention. Two groups of claims were patented and operations begun on them. About 1600 tons of lignite coal was shipped from the Whorf property near Seldovia, on Cook Inlet. Much of the coal brought $4 per ton f.o.b. the mine, though some was delivered at Seward at that figure.

He goes on to tell about the expedition of the Bureau of Mines and its exploratory work and says:

> A small quantity of lignite was mined near Candle and Wainwright for local use, and patents were issued on claims in the Cook Inlet field and on Admiralty Island.

That is the summary of the coal production of the great coal districts of Alaska in the year of grace 1913. It sometimes seems as if Russia would have done better work in developing the Alaska coal than has the U. S. Government if she had only retained her American possession. The only real coal mine is at Seldovia. It mines 5 tons per day, the stint of one red-blooded man, and this mine was opened by the Russians years ago before the United States obtained Alaska.

The same inspector who thus reports a contemptible coal industry gives page after page of information on the gold, silver and copper outputs and mines. Ten thousand tons of copper came from the territory of Alaska in 1913 and only about 1600 tons of coal.

We cannot see why the general public believes gold and silver prospectors should be encouraged and coal miners harried and plundered at every available opportunity. For coal is power; it lightens burdens and gives warmth to all, whereas gold and silver are but the symbols of real things and the world would be almost as rich had men possessed neither.

American Coal and the War

The European war has changed the coal business at San Francisco from one of the most prosaic of trades to one of the most romantic. For several months past English and German cruisers have played hide-and-seek up and down the Pacific coast, just outside the three-mile limit in making efforts to capture merchant vessels of the opposite nationality engaged in the trans-Pacific trade. Numerous hairbreadth escapes have occurred on the part of the harassed merchantmen, and but few captures have been effected.

The problem of coaling has been a strenuous one for the German war vessels thus far and all sorts of strategic methods have been tried.

The steamer "Mazatlan" was held in San Francisco under suspicion of attempting to violate the neutrality regulations for some time before being allowed to sail for Mexico with coal. It has been claimed by interested parties that this coal was finally lightered out to a German war vessel after being delivered in Mexico and the case is still being threshed out by U. S. Government authorities.

A more celebrated case, however, is that of the steamer "Sacramento," formerly the Kosmos liner "Alexandria," a German steamer, which had been interned at San Francisco for several weeks, in company with its sister ship, the "Serapis." The North & South Steamship Co. was formed in San Francisco by local parties who purchased the "Alexandria" and registered it as the "Sacramento" and raised the American flag. A cargo of coal was loaded for South America, ostensibly for the use of an electric lighting plant. Rumors were started that the cargo was intended for German warships off the coast and much delay resulted, the vessel being kept under surveillance while protests were passed back and forth between San Francisco and Washington. Finally, the "Sacramento" was permitted to leave port and it is now well on its way to its destination, if it has not been captured by some British war vessel. In case of such capture, an international case of the highest importance will be developed.

The real danger to American trade lies in the fact that if German vessels are allowed to sail in this manner, and warships are coaled, the British are sure to raise the rates of war-risk insurance to a point that will seriously hamper our efforts to build up a merchant marine. It is reported on good authority that steps appear to have been taken already looking in this direction.

Panama Canal and American Coal Trade

One of the most important recent changes affecting the American coal trade is the impetus added to the shipping of American coal from the Atlantic coast to San Francisco and other Pacific ports through the opening of the Panama Canal. Heretofore the greater part of the coal that came around the Horn constituted shipments of steam coal for the United States Government for the use of the navy, and practically all of that was carried by foreign bottoms.

Now that the opening of the Panama Canal and the granting of American registry to foreign vessels is permitting a material increase in the United States merchant marine, a number of new steamer lines are sending scores of vessels via the Panama route to the Atlantic ports laden with lumber, dried fruits, canned fruits and a variety of Pacific coast products. These vessels must have return cargoes in order to operate successfully, and coal has already become a very important item in their westbound cargoes.

The Sudden & Christenson Steamship Line, which has six steamers engaged in the intercoastal-traffic, has already delivered several cargoes of coal at Pacific ports

and has more on the way. Other lines are seeking to build up a similar traffic. This Eastern coal trade will come into direct competition with the Australian bituminous coal, which has for many years been a favorable fuel for domestic use in San Francisco.

One difficulty Eastern producers of high-grade coal will have to face is the task of educating San Franciscans up to paying more for this American coal than they do for the Australian product. However, in the matter of price, some of the Alabama coal should be able to compete successfully with the foreign product.

In most parts of the Pacific coast, oil predominates as fuel. However, the coal trade is not inconsiderable even now and is certainly increasing. California is not a coal-producing state, although there are mines at Stone Cañon, Monterey County, which might produce a fair grade of fuel. Just at the present time, these mines are not operating, owing to difficulties in getting the coal to market, and also because of recent numerous fires in the mines.

In California there is probably 50,000 tons of Eastern bituminous coal used each year. This tonnage is now being brought by way of the Panama Canal, and because of the reduced freight rate is selling at $3 per ton under former prices.

As a further stimulus to the coal trade, it is predicted that the United States Government, in order to attract business to the Panama Canal in competition with the Suez route, will establish coaling stations in the Canal zone, which will enable steamers passing through the canal to replenish their coal supplies at this point. An article covering this subject will be published in COAL AGE about Nov. 28.

Proper Mining Laws

No matter is more vital to the coal industry than action tending to the passage of sensible, comprehensive mining laws. The industry should be carefully and completely regulated. It is not a business that can be ruled at random. The hazards are great. However, legislation can be enacted that will govern and yet not stifle progress. We can rule in the interest of safety and efficiency and still encourage the mine owner to broaden and develop his operations.

We therefore call particular attention to the discussion now starting on p. 798, and we sincerely trust that every coal man who can spare a few minutes' time will write us his views so that every phase of the subject will be brought to light. We need uniform laws—not legislation that handicaps one operator and benefits his competitor in another field. We also need laws that can be enforced; therefore they must be based on experience and a complete understanding of the economic and physical difficulties surrounding mining.

The folly of the coal industry has been the policy of its units to act independently. Individual initiative is all right, but beyond a certain point results can be attained only by united effort.

How can the industry, in your eyes, be benefited? How can the safety of men and property be advanced? How can coal supplies be conserved and efficiency of operation be insured? What laws are foolish, unfair or impossible? What and where is the remedy? How can we put the industry on a conservatively profitable basis?

When we have published a sufficient number of answers to these questions, COAL AGE will try and see that lawmakers in all coal states receive a copy of the correlated views of its readers.

A State of War and Yet No War

The correspondence in relation to the Colorado strike conditions published in this issue shows the undesirability of absentee control and the lack of knowledge of the situation in Colorado on the part of the President's cabinet. First, no man may be employed, then none but those who come unsolicited and to replace those not discharged, then none but citizens, and finally none but residents. The only consistent element in the rulings was the desire to hamper operations and help the union as far as possible without outraging public sentiment.

The President thinks it unreasonable to keep troops in Colorado indefinitely. The operators may well think it equally unreasonable for him to hedge their business operations with restrictions for such an extended period of time. In every case of martial interference with private business, coercion should be removed first, the troops much later. If coercion and offenses against liberty continue up to the end of the occupation, how can conditions be normal when the force is withdrawn?

If operators cannot be allowed to hire men because a state of war exists making this inadvisable, how can the time have arrived for excusing the President in declaring that the war has come to an end and justifying him in the removal of troops?

British Face Difficulties

The supply of pit-props in Great Britain is fast disappearing. This is one effect the present war is having on coal mining in England and Wales. There is very little timber available in Great Britain for use as mine supports, and the supplies from Russia and other countries are greatly curtailed.

The question seems to be as to what material shall be substituted for wood. One company in meeting the situation has purchased a quantity of second-hand metal tubes. Some of these measuring 5 ft. long and 3½ in. in diameter were built into novel props. At the top and bottom there was a tapered plug which fitted tightly inside the tube; between these two plugs, coal dust and sawdust were inserted and compressed. The resulting prop was less rigid and would bear weight without buckling.

Truly, war creates necessity and necessity fosters invention.

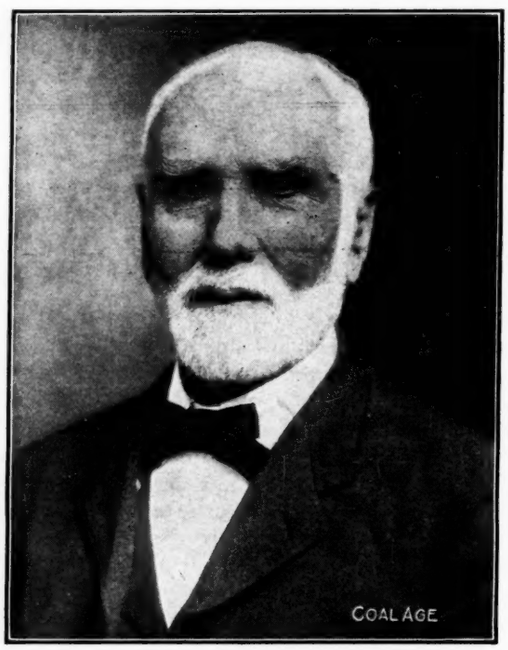
It is no surprise to us that the voters of Ohio have signified their impatience with the high-handed methods of the retiring administration in that state. Certainly the issue was closely contested. But this was only to be expected when one remembers the spectacular appeal for the labor vote which Governor Cox made at the sacrifice of every other consideration. It is particularly gratifying, in the face of such a desperate effort, to note that the conservative element of the population still predominates. In the years to come, when the people of Ohio look back upon the record of the coal industry for 1914, this alone will be sufficient explanation for the present change in administration.

Who's Who in Coal Mining

Robert Lee

One of the pioneers of the coal industry of the Middle West is Robert Lee, of Rock Island, Ill. He was born in the County of Durham, England, July, 1834, and came to the United States with his parents when 14 years of age. The Lees settled first in Pittsburgh, later moving to Washington County, Penn., where they resided until the fall of 1851. In this latter year the family moved to Hawesville, Ky., a town on the lower Ohio River.

While in Kentucky, the elder Lee purchased a farm in Perry County, Ind. However, young Robert Lee had secured work in the coal mines near Hawesville, and continued in this employment after his father and the rest of



ROBERT LEE

the family had gone to Indiana to live on their farm. In August, 1856, Robert Lee married, and after spending a short time at his father's home in Indiana, left for Rock Island, Ill., where he secured employment with the Coal Valley Mining Co., being the first miner engaged to work for this newly organized corporation.

Mr. Lee continued in the employ of the Coal Valley Co. as a miner and tracklayer until the fall of 1861, when this same company proposed to him that he take a lease from them to open up a mine for the local trade. He accepted this proposition, signing a five-year lease, with the privilege of a three-year extension.

Shortly after Mr. Lee had opened up this new mine and put it on a producing basis, the Coal Valley Mining Co. offered him the superintendency of their railroad mines. He accepted this position, which change in his employment necessitated his turning over the management of the local mine to a partner, whom he had taken into his business some time previous.

In 1865, Mr. Lee, in conjunction with his partner, purchased the property and stock of a general store in the town of Coal Valley. This business was managed by hired employees, under the firm name of Lee & Bardsley. In October, 1869, Mr. Lee left the employ of the Coal Valley Co. to engage in the active management of his mercantile business. The following year he purchased his partner's interest in their commercial venture and devoted his full time to merchandizing. In 1875, his health failing because of too close confinement to business, he advertised for sale all of his store properties and stock of goods.

Officials of the Coal Valley Mining Co., in August, 1875, proposed to Mr. Lee that he locate and purchase a new coal field for their company in Mercer County. This work he accomplished, and in 1876 his employers built the Rock Island & Mercer County R.R., a branch line 26 miles long and extending to Cable. In 1894, this line was built on to Sherrard, where the Sherrard mine, a property still operating, is located.

In 1907, Mr. Lee was again confined to his home by illness, and in September of that same year wrote his resignation to Carl Scholz, president of the Coal Valley Mining Co. This resignation was accepted by Mr. Scholz on Sept. 11, the 51st anniversary of the day Mr. Lee first entered the employ of the Coal Valley Co. Since that time Mr. Lee has lived a retired life, his second son, Robert Lee, Jr., having succeeded him as superintendent of the Coal Valley Mining Co.

There is no man who has ever been connected with the coal-mining industry of the Middle West more universally beloved than Robert Lee, the daddy of them all in the State of Illinois.

A Record Output in Illinois

The mine of the New Staunton Coal Co., located at Livingston, Ill., has been hoisting coal at a very rapid rate since business began to pick up for the fall. During the first half of September, working $9\frac{7}{16}$ days, they hoisted 42,289.8 tons, making an average of 4481 tons per day. During the second half of the same month, working ten days, they hoisted 45,822.95 tons; making an average of 4582 tons per day. This makes a total average of 4533 tons for every day worked during the month of September.

The best single day's hoist made at this mine was on Oct. 3, when an output of 4772 tons was brought to the surface, which required 1635 hoists. This mine is located on the Big Four R.R., in Madison County, and is a shaft mine. The shaft is 287 ft. deep to the No. 6 seam; the coal is mined by machines and is of a good quality.

The annual output of the mine for the past three years has been as follows: 1912, 737,632 tons; 1913, 848,715 tons, and 1914, 805,752 tons. There were several weeks that the mine was idle, during 1914, on account of the wage settlement. For the year ended June 30, 1913, this mine ranked first in the state in production; it was third in 1912, although during 1912 they made the best average for the whole year.

T. G. Hebenstreit is the superintendent in charge of the property, and great credit is due him for his able management. We can expect even greater records to be made under his careful and efficient supervision.

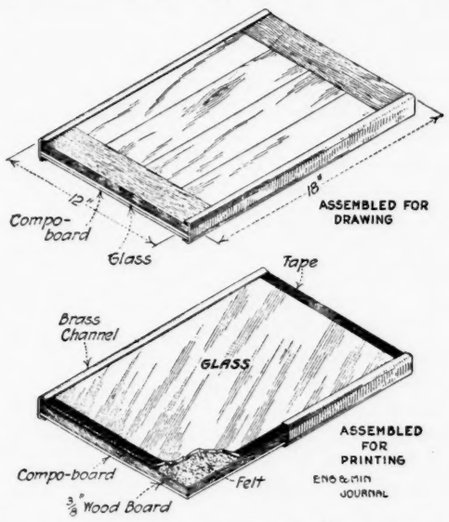
The need for boiler settings which will not leak air has caused the United Electric Light & Power Co., of New York City, and others to case their boiler settings with steel, using heat insulation between the brickwork and the metal to protect the latter.—Bromley in "Power."

Portable Combined Blueprint Frame and Drafting Board

Many engineers engaged in examination work have felt the need of tracings and blueprints to accompany their reports and often have had to wait to make them until a place was reached where there were facilities—with inconvenience to themselves and loss of valuable time. For this reason, an article by F. W. Foote in the *Engineering & Mining Journal* is of timely interest to coal engineers.

Mr. Foote has devised an outfit which is light and compact, fitting in a suitcase, and performing well the work required of it. It consists of a drawing board, 12x8 in., built with end cleats rather than back cleats; a piece of "Compo" board; a piece of clear glass of the same dimensions; and two channels of brass, 18 in. long and of the desired thickness.

The drawing board is ⅜ in. thick. If made up of several narrow strips and held together by the end cleats, the danger of warping is greatly reduced. One side is



MANNER OF ASSEMBLING FOR DRAWING AND FOR PRINTING

dressed for drawing and the other side is covered with felt. The glass is bound on the edges with adhesive tape to prevent chipping and lessen the danger of cracking where the channels come in contact with it. The channels are of sufficient depth to accommodate the board, glass, "Compo" board, a reasonable amount of tracing cloth, drawing paper and blueprint paper, the latter being kept in a black-lined case or tube to protect it from the light.

The drawings show the outfit assembled with the glass inside, for use as a drawing board; and also with the glass outside for blueprinting. Thus assembled, it can be set up in any window-sill in the sun and the blueprints washed in the bathtub if the engineer is in a hotel or in a hand basin if he is in the field. The whole outfit may be made for a dollar or so; if it does not have to be carried in a suitcase, the size may be altered as desired.

⁂

Our Front Cover This Week shows two installations of Jeffrey mine fans. The upper one is a view of a 16-ft. double-inlet exhaust fan, direct connected to a steam engine for the Delaware, Lackawanna & Western R.R. at the Truesdale Colliery, Scranton, Penn., and the lower view is a 20-ft. double-inlet exhaust fan, direct connected to an engine installed at the Woodward colliery of the same company.

Difficulties in Fan Shipment

The Henderson Coal Co., for installation at a new development at Hill Station, Penn., recently ordered a 150,000-cu.ft. capacity Sirocco fan, to be shipped from the factory assembled. As the limit of height for a railroad car was 15 ft., it was necessary to decidedly alter the construction of a flat car to accommodate this wheel.

As finally shipped, the fan wheel was supported on edge and extended down through the floor of the car, clearing the top of the rails by 6 in. This allowed the wheel to successfully pass under bridges and through tunnels on the railroad. The wheel alone weighed nearly 6 tons, while its steel housing made up a separate carload.

While many fans are at present in use of larger diameter than this one, it is seldom that the large sizes are shipped in one piece, or that such severe measures have to be taken in their transportation.

⁂

A Record Production

Ebensburg No. 1 mine of the Ebensburg Coal Co., at Colver, Penn., for the month of October, produced 102,700 net tons. This is remarkable, when it is considered that this is from a single opening, and the seam of coal only 3½ ft. high. It is doubtful whether this feat has been surpassed or equaled by any single opening in the United States operating in a low bed of coal.

COAL AGE especially invites data from coal companies recording instances of noteworthy achievement.

⁂

Erratum

R. V. Norris informs us that the equation for size of pillar in his article on "The Conservation of Anthracite Coal," republished in our issue of Oct. 31, on page 707, should read:

$$p^2 + \left(\frac{7}{3}T - \frac{DT}{300}\right)p = \frac{CDT}{300}$$

The equation $s = \frac{8fx'}{3ws}$ should read $s = \frac{8f}{3w}$;

$\frac{x'}{s}$ = number of cars per yard of chamber.

⁂

Coming Meetings

The American Society of Mechanical Engineers will hold its annual meeting in New York City, Dec. 1, 2, 3 and 4, 1914. Calvin W. Rice, secretary, New York City.

The American Mining Congress' seventeenth annual session will be held at Phœnix, Ariz., Dec. 7, 8, 9, 10 and 11, 1914. J. F. Callbreath, secretary, Denver, Colo.

The Coal Mining Institute of America will hold its winter meeting Dec. 8 and 9, 1914, at the Fort Pitt Hotel, Pittsburgh, Penn. Charles L. Fay, secretary-treasurer, Wilkes-Barre, Penn.

The West Virginia Coal Mining Institute's winter meeting will be held at Huntington, W. Va., Dec. 9 and 10, 1914. Prof. E. N. Zern, secretary-treasurer, Morgantown, W. Va.

The American Institute of Mining Engineers will hold its annual meeting in New York City, beginning Feb. 16, 1915. Bradley Stoughton, secretary, New York City.

The Kentucky Mining Institute's winter meeting will be held Dec. 4 and 5, 1914, at the Seelback Hotel, Louisville, Ky. Ivan P. Tashof, secretary-treasurer, Lexington, Ky.

Discussion By Readers

Mining Law, Legislation and Mine Regulations

Letter No. 3—In the issue of COAL AGE, Oct. 31, p. 698, I note the invitation for comments and discussion relating to mining laws, legislation, or mine regulations, by those affected by such laws and regulations. This suggestion is most timely, and I hope that it will receive the cordial response that it deserves.

I am especially prompted to write this letter because of a very common misunderstanding in regard to the representation made by coal operators and operators' associations, before the state and national legislatures. There is no question that the coal operators have been too diffident in respect to the presentation of suitable laws for enactment designed to benefit the industry. Mining laws should involve both the safety of employees and the stability of the business, as the two go hand in hand. Any legislative measure that unfairly attacks the industry, sooner or later reacts upon the employees, either by affecting their wages or conditions of safety, or both. Therefore, proper representation by the coal operators before the law-making bodies is not only desirable, but *a positive obligation.*

Too often such representations are referred to as "lobbies," with the common understanding that a lobbyist is either a grafter or a person who, by undue influence over legislators or congressmen, endeavors to obtain a condition to which he is not properly entitled. No worse misconception could exist in respect to any honest and legitimate endeavor, on the part of those interested, to secure legislation that would benefit an industry.

With the many problems that confront our legislative houses, both state and national, it must be evident to thinking men that their representatives cannot possibly be thoroughly posted on the various matters that come before them and demand intelligent action. A legislator cannot possibly vote intelligently on a matter pertaining to a line of business with which he has little or no practical acquaintance, unless he can appeal to some authority for correct information and advice.

For example, it is not reasonable to suppose that a congressman from Florida would know much about the apex law, which is of the greatest importance to the metal-mining industry. Many similar examples can be mentioned, and it would seem necessary, therefore, for the various industries to have representatives available on whom members of congress can call for any desired information, which should be furnished them as accurately as possible. By such methods it can readily be seen that what was formerly known as a "lobbyist" would, instead, prove to be a most useful representative. I may add that with this purpose in view, solely, the American Mining Congress has maintained its office at Washington.

The mining laws of Illinois have been very carefully considered by a commission appointed for that purpose. The members of this commission were chosen from representatives of the mine owners, mine workers and the state and national governments. The work of this commission has resulted in giving to Illinois complete and effective mining laws, which afford greater protection to the mine workers than the previous statute. It has even been stated that the Illinois code is "as fine a body of mining laws as exists in the United States, and that its solicitude for the well-being of the worker has been carried to the point of injustice to the mine owner." This editorial statement, in one of the leading newspapers of this country, emphasizes the fact, which is quite generally true, that *mining conditions are viewed from the standpoint of the employee only.*

Besides its excellent mining code, Illinois has a Workmen's Compensation Act; and many of the mines of the state are being operated under that act. It yet remains to be seen, however, whether this will afford the expected protection of the mine workers; because as the old adage says, "You cannot get blood out of a turnip."

Consider, for a moment, the terrible results of the great mine disasters that have occurred and are still taking place in Illinois. In the case of the recent catastrophe at Royalton, it is generally hoped and believed that the company will be able to provide for the widows and orphans created by that disaster, just as the St. Paul Coal Co. was able to do in the Cherry disaster, Nov. 13, 1909. Fortunately for the families of the victims, in the latter case the company had the backing of a large corporation, which provided the desired protection.

But, from this condition, let us turn and ask, What would have been the effect of the Workmen's Compensation Act had the Cherry mine been owned by one of the many coal companies in this state not backed by other interests? Would it not have meant financial ruin to the company accompanied in most cases with no compensation to the widows and orphans? Under the present existing conditions of the coal industry in Illinois, it is a serious question whether, in the majority of cases, a great mine disaster would not mean the ruin of the coal company, without furnishing the desired compensation to the victims.

In order to be of value to the state, the coal industry must be placed on a sounder basis than exists at the present time. There must be coöperation. In the present order of things, coal-mine owners must deal with the miners' organization, in respect to the *wage scale.* In the matter of furnishing *protection to employees,* they must deal with the state of Illinois, either through the Compensation Act or by voluntary settlement of lawsuits. But, in the *sale of coal,* the coal operators stand singly and alone, with the result that the fiercest competition exists, which is destroying the industry by preventing an earning commensurate with the risk of the business. The present condition not only deprives the company of its just earnings, but robs the dependents of the employed, in case of accident, since no claim however deserving is of value when the company is bankrupt.

The coal operators do not desire a trust or a monopoly, and it is obvious this could not exist with the competi-

tion from other states. But, for the good of the industry, Illinois operators should be permitted, and, perhaps, required to coöperate in the sale of their coal, to the end that a price be obtained for the output that would enable them to pay proper wages and still realize a profit on their investment, besides providing for their employees, in case of accident. If wage scales are established and laws made effective by collective bargaining it is equally necessary that the same collective action should control the sale of coal.

In closing, permit me to say that no greater service could be rendered to society at large than the inauguration of a condition that would place the coal industry of the state on a stable basis, both in respect to the mining and selling of coal.

CARL SCHOLZ, President,
The American Mining Congress.

Chicago, Ill.

Letter No. 4—In his letter pertaining to mining laws, Letter No. 2, COAL AGE, Oct. 31, p. 722, I. C. Parfitt questions the wisdom and justice of the Pennsylvania bituminous mining law, requiring that all examination papers of candidates trying for certificates of competency as mine inspectors, foremen, etc., be retained and filed in the Department of Mines as state documents and not returned to applicants, after the examination is completed and the marks of proficiency determined. Although the mining laws of Tennessee have no mandatory act, requiring the examining board to file the examination papers of candidates in the State Mining Department as state documents, this is always done.

However, I am of the same opinion as Mr. Parfitt on this question, believing the work of the candidate before the board and his standing as determined and marked on each question by the board should be returned to him; thus giving him the benefit of the knowledge accruing from any mistake made by him in the examination. By this means, his work becomes a schooling to the applicant, giving him an opportunity to profit by his mistakes.

The examining board in Tennessee is composed of the chief mine inspector and his two district inspectors. The law requires the chief inspector to have had "six years' experience in mining," and also "possessed of a competent knowledge of chemistry, geology and mineralogy of Tennessee, so far as these sciences relate to mining, and a practical knowledge of mining engineering." The two district inspectors are required to have had six years' practical experience in mining and to hold a "Class A" certificate of competency. These requirements make the mine inspectors of Tennessee, who by law constitute the board of examiners for mine foremen, assistant foremen and gas bosses, well qualified to pass on the competency of candidates for certificates. The board is both technical and practical and, being appointed by the governor, is naturally fair and impartial to applicants and operators alike.

The method adopted and followed by the board is to select, as far as possible, practical questions; or, in other words, questions that can be answered by possessing only a practical knowledge of mining. The board seeks to ascertain by these questions, as far as it can, what the applicant knows about mining from experience; instead of what he has learned from others, in this respect. Each question propounded to applicants is given a certain value or is worth so many points if answered correctly. One question may be valued at 10 points, and another at 25 points. The value of a question thus fixed by the number of points given to it shows the candidate, at a glance, the importance of that question, and the value placed upon it by the board, as showing the candidate's knowledge of those things most essential to safety and the protection of life in mining, and his ability to successfully manage mines.

JOHN ROSE,
District Mine Inspector.

Dayton, Tenn.

To Prevent Freezing of Mine Shafts

Letter No. 1—Replying to the inquiry of a Mine Superintendent, COAL AGE, Oct. 31, p. 725, asking for the best method of keeping his hoisting shaft from freezing during cold weather, will say that I would consider some other method before adopting either of the two he mentions. Unfortunately, the inquiry does not state whether the fan shaft is wet the same as the hoisting shaft; or whether the mine gives off gas, or is worked with open or safety lamps.

Assuming, however, that the mine is gaseous and is worked with safety lamps and that the fan shaft is also wet, I would suggest reversing the air current, thereby making the hoisting shaft the upcast. The warm return air from the mine would prevent any freezing in the hoisting shaft. In addition to this, I would heat the air in the downcast shaft to prevent it from freezing. By adopting this method, the danger of the pipes being accidentally broken is averted; the mine air gets the benefit of the added humidity; and the hoisting shaft now being the upcast instead of the downcast, the tipple dust is blown away from the mine instead of being carried into the mine, as is necessarily the case when downcasting the air at the hoisting shaft. This method will also eliminate the undesirable feature of the men working at the shaft bottom, in a warm, moist and enervating atmosphere.

While I consider the two methods referred to by Mine Superintendent as being practical, I believe the method I have described above has some additional good features, provided, of course, that the conditions will permit of changing the direction of the air current.

C. O. MESSENGER,
Mining Engineer.

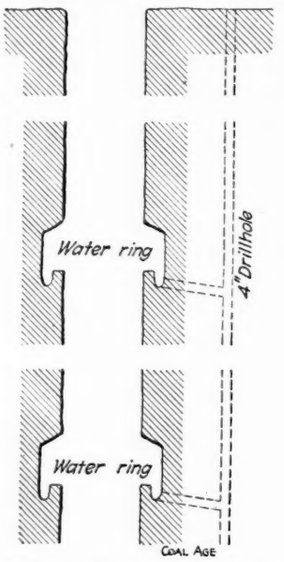
Wilsonburg, West Va.

Letter No. 2—Replying to Mine Superintendent, COAL AGE, Oct. 31, p. 725, in regard to the best method of preventing the freezing of the hoisting shaft in cold weather, I assume that the hoisting shaft, in this case, is the downcast and that the fan is exhausting.

In the first place, I would suggest that the simplest remedy to apply is to reverse the air current, in cold weather, whenever this is possible. In other words, run the fan as a blowing fan and force the air into the mine instead of exhausting as at present. By this means, the fan shaft is made the downcast and the hoisting shaft the upcast for the entire mine. The air current in passing through the workings becomes heated and the freezing of the hoisting shaft is prevented.

If ice accumulates in the fan shaft, in this arrangement, the difficulty can generally be avoided by turning the exhaust steam from the fan engine into the shaft. This will, of course, produce a fog in the intake air current for a short distance from the bottom of the shaft; but that will disappear before the air reaches the workings. Such an arrangement is commonly adopted in many localities.

In regard to rendering the shaft waterproof by lining it with concrete by means of the cement-gun, I do not believe that this can be done successfully, as water will still come in around the timbers. While some shafts are lined with a tight curbing from top to bottom, others only have timber sets 4 or 5 ft. apart and, in others, buntons alone are used to carry the guides and pipe lines in the shaft. Assuming that the shaft in question has timber sets, say 5 ft. apart, the question arises, would it be possible to make this shaft waterproof around the timbers by the use of a cement-gun. Also, it must be remembered that when the timbers require to be renewed, it will be necessary to renew much of the cement lining.



WATER RINGS IN A WET SHAFT

I want to suggest a method of draining this shaft by water rings run around the shaft, just below the water-bearing strata. This method has been tried and has proven successful in draining the shaft to an extent that freezing is wholly prevented. As shown in the accompanying figure, the water rings are made by excavating an annular opening in the strata completely surrounding the shaft and providing a ditch in this opening, which is drained by means of a borehole connecting the ditch with a 4 or 6-in. drillhole sunk at the side of the shaft, from the surface. This drillhole should be about 4 or 6 ft. away from the shaft and drain the water to the sump at the shaft bottom, from which it is then pumped to the surface.

Where the shaft makes a considerable amount of water, it is often better to locate a sump at each water ring and install pumps at these points to handle the water draining into each sump. By this means, the water is pumped directly to the surface instead of draining to the bottom of the shaft, which decreases the cost of pumping.

PENNSYLVANIA MINING ENGINEER.

Uniontown, Penn.

Storage-Battery Locomotives in Mine Haulage

Letter No. 1—I read with interest the description of the Grant mine, by R. Dawson Hall, COAL AGE, Oct. 10, p. 576. We are always open to constructive criticism but feel that Mr. Hall failed to understand our aims and the circumstances with which we and other Indiana operators must contend.

It is our constant aim and endeavor to *mine coal profitably,* by the use of safe and economical practices. However, in the face of the present seeming inability to raise the selling price much above one dollar per ton for mine-run coal, and with the operators in the thick seams across the state line apparently bent upon compelling the consumer to accept their mine-run coal at 95c. per ton, the resulting cost-sheet necessarily modifies many of our ideals to a greater extent than can be grasped by the occasional visitor who comes to us fresh from the more prosperous fields where possibly *labor* bears some of the burdens that in Indiana must rest upon the operator.

One of the most important modifications in the methods of mining that Indiana operators have had to accept relates to pillar work. The prevailing idea in Indiana has been that the pillars could not be extracted, with profit; and up to the present time room breakthroughs have usually been slabbed and all room pillars left standing. But with the increasing cost of coal in the ground, we are being forced to aim at a more complete extraction. At the Grant mine we have adopted the principle that all pillar coal must be mined if it can be gotten profitably.

The extremely fragile character of the mine roof and its tendency to cut, under the alternate wet and dry condition of our mines—these together with the narrow margin between a fixed mining rate and an equally uncompromising selling price, make it imperative that all extraction within a given area shall be immediate. Any coal left behind is soon obstructed by falls and must be abandoned.

We have adopted the plan of driving our rooms 21 ft. wide, to a depth of 200 ft., with the track 5 ft. from the rib. When the room is worked to the boundary, the pillar is drawn back to the neck and all available timber and track removed as the work recedes, every effort being made to induce a fall of roof. Room pillars are left not more than 9 ft. thick, which is sufficient to support the roof during the process of working. A greater width of pillar would increase the cost of breakthrough yardage and inevitably require the turning of a track into each breakthrough, for a miner in this state cannot be compelled to throw his coal a greater distance than about 12 ft., and the company must pay for keeping up his track.

A breakthrough, in order to be driven without yardage cost, must be at least 18 ft. wide. Whether long or short, crosscuts of this width cannot be maintained without ample props and this item of expense soon eats up the saving of a wide breakthrough. For this reason, we have developed the mine in panels about 500x900 ft. each, with 100-ft. barrier pillars against the main haulageways, as shown in the plat, COAL AGE, Oct. 10, p. 578. In these panels, we aim to get as large an extraction of coal as circumstances will permit, and in doing this we encourage the roof to fall immediately behind the work. When it breaks, as it usually does, we have no trouble. Occasionally, it will not break, but rides the room stubs and crushes the chain pillar. In order to obviate this possibility, we are now working out four rooms on an entry, as we advance, leaving the next three rooms to be gotten on the retreat. This block of solid coal acts as a support to the roof when it will not break, and relieves the crushing strain on the room stubs and chain pillar.

Thus far, we have gotten the bulk of the pillar coal and, in an operation of about a year and a half ago, no miner has even been scratched by falling slate. The rooms are

well propped and if a piece of roof becomes dangerous no risks are taken to extract the pillar. If Mr. Hall will outline how, in his judgment, pillars in our seam can be *gotten profitably* it may stimulate a discussion and experiments that will lead to something better.

In regard to the storage-battery locomotives, it is presumable that there are as good or better makes. There has been some dissatisfaction with a few tried out in Indiana mines; but this is seemingly the fault of crude design; or disproportionate construction and use of too small a motor for the intended load; or batteries not fitted for the voltage or amperage of the motor; or poor transmission; or some other obvious defect. The Jeffrey motors with wormgear, carrying Edison storage batteries, have made good in our mine. They have shown a greater performance than the makers were willing to guarantee and are altogether up to our expectations in performance, in endurance and in economy of operation.

Given a thin seam of coal, you have the alternative of using a small mule and a little car or incurring the expense of taking up a large amount of bottom on all roads, during the entire life of the operation. Therefore, if such a mine is being developed with the assurance of a long life, justifying its being well equipped, there are strong reasons for gathering the coal with motors.

Some who have tried the reel or crab locomotives are enthusiastic in their praise. We have never used any motor of this type; but our experience with the storage-battery locomotives would make it hard for us to recommend any other type of motor for gathering.

Its obvious advantages are the elimination of the cost of trolley wire, rail bonds and reel-cables, and the absolute freedom of action that permits the motor to go anywhere on almost any kind of track and work equally well either pushing or pulling, to say nothing of the absolute quietness of the whole operation as compared with the sweat, stench, turmoil and profanity of the mule haulage. These items directly affect the daily cost-sheet by the saving they cause in drivers, mule feed, harness, shoeing, mule depreciation and hospital expense. With four motors we gathered regularly between 1400 and 1500 tons of coal, while with the six motors now operating, we expect to haul upward of 2200 tons without difficulty, when the mine will furnish that tonnage, which means that we are easily displacing four mules with one motor.

Such results, however, can hardly be obtained except in a panel mine, where the gathering operations can be confined within a given radius and the partings kept close to the working face.

THEODORE BRENT, President,
Grant Coal Mining Co.
Chicago, Ill.

Study Course in Coal Mining

BY J. T. BEARD

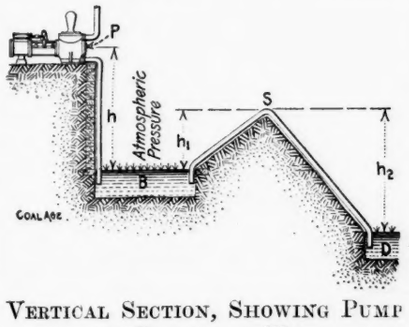
The Coal Age Pocket Book

Siphoning or Pumping Hot Water—Since water vaporizes at all temperatures, the vacuous condition existing in the suction pipe of a pump or in the short leg of a siphon is reduced by the tendency of the water to form vapor under the reduced pressure in the pipe. In other words, the atmospheric pressure that forces the water up the suction pipe is opposed by the tension of the water vapor in the pipe, which reduces the atmospheric head effective in raising the water.

As shown by the table giving the saturated water-vapor pressures or tension, at different temperatures, the pressure of the vapor increases rapidly with the temperature; and at 212 deg. F. is equal to the normal atmospheric pressure at sea level (14.696 lb. per sq.in., or 29.925 in. bar.).

As shown by the table giving the normal atmospheric pressure, at different elevations above and below sea level, this pressure decreases as the elevation above sea level increases and vice versa. But whenever the vapor pressure is equal to the atmospheric pressure ebullition takes place (see Laws of Vapors). For this reason water boils at about 203 deg. F., at an elevation of 5000 ft. above sea level; or 193 deg. at 10,000 ft. elevation. The boiling point, for any given elevation, marks the limit of temperature for pumping with a suction pump or for siphoning, since the vapor pressure then conterbalances the atmospheric pressure and the water will not rise in the suction pipe.

The accompanying figure shows clearly that it is the atmospheric pressure acting on the surface of the water in the sump or basin B that forces the water up the pipe to the pump at P, or to the crown of the siphon at S, against the more or less vacuous condition at those points.



VERTICAL SECTION, SHOWING PUMP AND SIPHON AT WORK

It is evident that if the water is hot its vapor pressure will resist the atmospheric pressure and, to that extent, reduce the effective suction head. Obviously, therefore, the possible suction head of a pump or siphon depends on two important factors, aside from the mechanical perfection of the apparatus; namely, (1) elevation above or below sea level, as determining the atmospheric pressure; (2) temperature of the water, as determining its vapor pressure.

The Coal Age Pocket Book

Safe Suction Head, Vertical Lift—The safe limit of suction, in feet, when pumping or siphoning hot water, assuming a fairly vertical lift, may be taken as about nine-tenths of the effective barometric pressure, in inches; or, in other words, the height of the barometer, in inches, diminished by the vapor pressure expressed in inches of mercury.

Example—Find the practical limit of suction when pumping water from a sump where the temperature of the water has been raised to 150 deg. F., by the discharge steam of the pump, the elevation being 3000 ft. above sea level and the suction pipe vertical.

Solution—From the tables, the normal barometric pressure, at this elevation, is 26.813 in. and the vapor pressure of water, at a temperature of 150 deg. F., is 7.57 in. of mercury. The effective barometric pressure is, therefore, 26.813 — 7.57 = 19.243 in. The safe vertical suction may then be assumed as 0.9 × 19.243 = 17.3, or 17 ft. 4 in.

Inclined Lifts—When the suction pipe is much inclined, as when pumping in slopes, or as is almost invariably the case in all siphon work in mining, the frictional resistance of the pipe is much increased by reason of its greater length. This increased resistance reduces the effective head.

The length of pipe, for the same vertical height, varies inversely as the sine of the slope angle (a), and the loss of head likewise. But, for a vertical lift, the loss of head, in feet, was assumed as one-tenth of the barometric height, in inches, (0.1 B). Hence, for an inclined lift, slope angle a, the loss of head may be taken as 0.1 B/sin a, which makes the **effective head,** B(1 — 0.1/sin a), in which B is the effective barometric pressure, after subtracting the vapor pressure for the given temperature of the water, expressed in inches of mercury.

Example—Find the effective suction head of a mine siphon, the short leg or suction pipe having a slope of 30 deg. from the horizontal and the water to be drained having a temperature of 130 deg. F., the barometric pressure in the mine being 28.4 in. Also, calculate the length of the pipe for this maximum lift

Solution—The saturated vapor pressure at a temperature of 130 deg. F., is 4.52 in. of mercury; and the effective barometric pressure, in this case, is 28.4 — 4.52 = 23.88 in. The safe suction head is, then,

$$h = B\left(1 - \frac{0.1}{sin\ a}\right) = 23.88\left(1 - \frac{0.1}{sin\ 30^\circ}\right)$$

$$h = 23.88\left(1 - \frac{0.1}{0.5}\right) = 23.88 \times 0.8 = 19.1\ ft.$$

The maximum length of suction pipe, under the given conditions, is, then,

$$l = \frac{h}{sin\ a} = \frac{19.1}{sin\ 30^\circ} = \frac{19.1}{0.5} = 39\ ft.$$

In ordinary mining practice, it is fairly safe to assume the coefficient of friction, in water pipes as 0.01, which forms the basis of the above assumed percentage of loss.

Inquiries of General Interest

Ignition of Coal in Storage

I would like to ask of COAL AGE and its practical readers any information they can give in regard to the best method of avoiding the spontaneous combustion of coal stored in large quantities in a bin; as, for example, where a winter's supply of coal is stored in bins in the basement of a building. If this coal should become heated and fire, what means can be adopted to prevent the spread of the combustion throughout the entire pile.

As a practical example, I would cite the following instance: Soft coal of a good quality which was stored in a bin in the basement of a school, in one of the wards in this city, became ignited, and the city fire department was called out to deal with the situation. It was found necessary, later, to remove the entire amount of fuel from the bin to get at the seat of the trouble.

As we are storing from 100 to 250 tons of coal at a time in our bins, 30 ft. underground or in the sub-basement, and cannot afford to take chances on the safety of this fuel supply, we would appreciate any information given by COAL AGE or its readers that will enable us to safeguard our supply of coal against possible trouble.

ASA P. HYDE, Chief Engineer,
Security Mutual Life Insurance Co.
Binghamton, N. Y.

The subject of the spontaneous ignition of coal in storage has received much attention at the hands of experimenters and investigators of coal problems. It cannot be said, however, that the subject is well understood at the present time, although much progress has been made in determining the source of the ignition.

For a long time, it was held by good authorities that the most active factor contributing to the spontaneous ignition of coal was the presence of iron pyrites so commonly found in coal. It is now well established that, while the presence of iron pyrites in coal greatly assists its disintegration, and, as a result, fresh surfaces of the coal are exposed to the action of the air, the oxidation of the pyrites is not the responsible factor in the ignition.

More recent experiments have shown that there are two processes set up immediately after the coal is taken from the seam and exposed to the atmosphere. These processes are the following: 1. The exudation of the hydrocarbons contained in the coal, which consist chiefly of methane (CH_4). 2. The rapid absorption of oxygen from the atmosphere into the pores of the coal, which is immediately followed by the oxidation of the organic matter of the coal, causing heat and liberating combustible gas within the coal itself.

As these processes continue, the ignition of the gas is quickly followed by the ignition of the coal itself, resulting first in the slow combustion of the coal, but often followed by a more rapid combustion. The addition of water to arrest this process only makes the matter worse, as the action is more rapid under moist conditions. The quantity of water required to stop the progress of the combustion in the coal would be too large to be practical, under ordinary conditions.

In order to reduce the liability to spontaneous combustion in large storage bins, it is advised that the bins should be built of incombustible material and constructed in such a manner as to allow the free circulation of air about the sides and underneath the floor of the bin. The ventilation of the coal pile itself by introducing streams of air into the pile, as has been done in some cases, is not well regarded. It is claimed that the admission of fresh air into the coal pile itself supplies more oxygen, and, to that extent, increases the oxidation going on in the coal. What is needed is a circulation of air outside, to cool the walls and abstract the heat as much as possible.

It has been found in practice that coal should not be piled to a greater depth than 12 or 14 ft. in a storage bin. When the depth of coal in the bin exceeds this amount, heating and spontaneous combustion are more liable to ensue. We would be glad to have this subject further discussed by readers who have had experience in the storage of large quantities of coal.

A Conundrum

Assume that a pound of coal contains 14,500 B.t.u., and it is clear that the heat derived from "one pound of this coal will raise (the temperature of) one pound of water, 14,500 deg. F.;" provided all the heat of the coal went into the water and the latter was confined under a pressure sufficiently great to prevent the formation of steam; and, assuming, further, that the specific heat of the water remained constant, as the temperature increased, which assumptions are not realized in practice.

A more reasonable statement, however, is that the heat derived from one pound of this coal is capable of raising the temperature of 14,500 lb. of water 1 deg. F.; or, applying the same reasoning, the heat derived from one pound of this coal would be capable of raising the temperature of 68.4 lb. of water 212 deg. F.; or, say from 32 deg. to 244 deg. F., provided again that the pressure in the containing vessel be sufficient to prevent the formation of steam under this rise of temperature.

This line of reasoning is quite clear to me, but there is no steam yet; and I fail to see what this argument has to do with the "efficiency of steam" that I read about in another mining paper. Perhaps some reader of COAL AGE can explain the intended meaning.

W. L. A.

Pittsburgh, Penn.

The term "efficiency of steam" has no intelligent meaning, except in relation to steam being made *the medium through which heat energy is converted into mechanical work*, as shown by the Rankine, Carnot, or other steam cycle. The above "argument," if such it may be called, has no reference to any cycle; but considers only the possible rise in temperature of a pound of water, caused by the potential heat of a pound of coal.

Examination Questions

Mine Foremen's Examination, Held at Price, Utah, Sept. 15 and 16, 1914

(*Selected Questions*)

Ques.—Do you receive and read any instructive literature pertaining to the various systems of coal mining and points of safety in operating same? What magazines along these lines do you take?

This question, which obviously must be answered from the candidate's own experience, is inserted here to show the importance of all candidates for examination as well as other mining men keeping up their study of mining questions and reading mining literature and being regular subscribers to mining magazines.—Editor.

Ques.—What four principal things are bandages used for?

Ans.—Bandages are used for the following purposes:

1. To keep dressings in place.
2. To hold splints in place.
3. To stop bleeding, by pressure.
4. As slings.

Ques.—Name the different kinds of bandages generally used in first-aid-to-the-injured work.

Ans.—The three kinds of bandages most commonly used are the triangular, roller and four-tailed bandages, described as follows:

1. The *triangular bandage* made from unbleached cotton cloth or from any available material, such as bed sheets, pillow cases, napkins and handkerchiefs, is made by folding a square piece of the cloth diagonally and cutting in the fold, which forms two triangular bandages.

2. The *roller bandage* is made by cutting muslin, cotton cloth, flannel, gauze or cheese cloth into long strips of any desired width and rolling up the strips into a neat roll for use.

3. The *four-tailed bandage* is made from strips of a roller bandage from 5 to 8 in. wide and about 3 ft. long. These strips are torn down the center from each end, to within a few inches of the middle of the bandage, thereby providing four tails by which the bandage is tied or bound about the wound. This bandage is mostly used in binding up the head.

Ques.—Describe the Red-Cross, first-aid outfit.

Ans.—The Red-Cross first-aid outfit is a hermetically sealed package containing a long gauze bandage having a compress of gauze sewn to it in the center. This bandage is so folded that it is impossible to touch the surface of the compress, which will cover the wound, except through carelessness. The package also contains a triangular bandage, printed so as to show how it is to be applied, two safety pins and all necessary instructions.

Ques.—Name some stimulants you would give and state how you would give them.

Ans.—Stimulants should never be given for an injury in the head. They are necessary in case of shock resulting from injury or otherwise. The best stimulants for use in first-aid work are hot coffee or tea, or aromatic spirits of ammonia, a teaspoonful in half a glass of water. If whisky or brandy is given, the amount should not exceed one or two swallows, as a larger amount is apt to produce depression, instead of stimulating the system. If alcohol is given, this must be pure and diluted with three times its quantity of water. Wood alcohol or denatured alcohol is poisonous and cannot be given.

All stimulants should be given as hot as can be taken, as the heat alone has a stimulating effect. A hot-water bag placed between the legs or against the outside of these members; or between the body and the arm has a stimulating effect; also, a light hot-water bag placed over the heart stimulates the heart action. Great care is required to make sure that the heat applied is not sufficient to cause a burn, especially if the person is unconscious.

Ques.—When should you send for a doctor, or take the injured person to a doctor?

Ans.—In all cases of serious injury or shock, send for a doctor at the earliest opportunity. There should be no delay, however, in giving first-aid assistance to the injured one. Where bones are fractured, the injured person should not be moved until after careful examination has been made and the proper splints and bandages applied, so as to prevent any sharp splinters of bone from cutting the flesh and possibly causing dangerous bleeding. Immediate efforts should be made to stop the dangerous bleeding of a wound, give the necessary stimulants and perform other first-aid work.

Ques.—(a) What is shock? (b) When does shock occur? (c) Describe the treatment of shock.

Ans.—(a) Shock is described as "a more or less profound depression of the nervous system." It is more commonly known as "collapse" or "prostration."

(b) Shock may be caused by the receipt of bad news or may result from a severe injury; but all persons are not equally sensitive to shock. A person suffering from shock becomes pale and has an anxious expression, his eyelids droop, the eyes are dull and the pupils often enlarged. The skin is cold and a cold sweat pervades the body. The sufferer is more or less stupid and often partly or totally unconscious, or his mind may wander. The pulse is rapid and weak and the person often lies quiet and will not move unless disturbed.

(c) In treating one suffering from shock, send for a doctor at once, but warm and stimulate the body in every possible way while waiting for the doctor to arrive. Place the injured person on his back, with the head low to induce the flow of blood to the brain. If the person is able to swallow, give stimulants, hot coffee or tea, or aromatic spirits of ammonia in water. These should be given in small quantities, a sip or a swallow at a time. If the person is unconscious and cannot swallow, smelling salts, water of ammonia, or hartshorn, should be applied to the nostrils. The arms and legs of the sufferer should be rubbed toward the body, underneath blankets to preserve the warmth of the body. Every effort should be made to apply heat to the limbs and body by means of hot-water bottles, hot bricks or hot bandages, care being taken to prevent causing a burn.

Book Review Department

HOW TO BUILD UP FURNACE EFFICIENCY. By J. W. Hays, consulting engineer, Rogers Park, Chicago, Ill., 126 pp. 5x7¼ in. 23 illus. Paper cover. Price $1.

This little book is not a scientific treatise but an extremely readable little volume for people who don't know anything about boiler-furnace efficiency and perhaps care less but to whom the subject is of the most vital and pressing concern. The reader will find the introduction too long and the first chapter trying, but when he has gotten a little farther in its perusal he will stay steadily with the author to the end and the rest of the book will be read in one sitting.

Hays is an Irishman with true Hibernian wit and he makes the problem of combustion interesting. When you have read the book, hand it to your firemen. They will read it and appreciate the fact that a practical man has written it. The reviewer as soon as he finished reading the book ordered a copy for a friend. It is likely the reader will want to do the same.

The author says that a furnace should pass about 40 per cent. more air than is necessary for complete combustion. Enough air has to be supplied to assure that the fuel is all

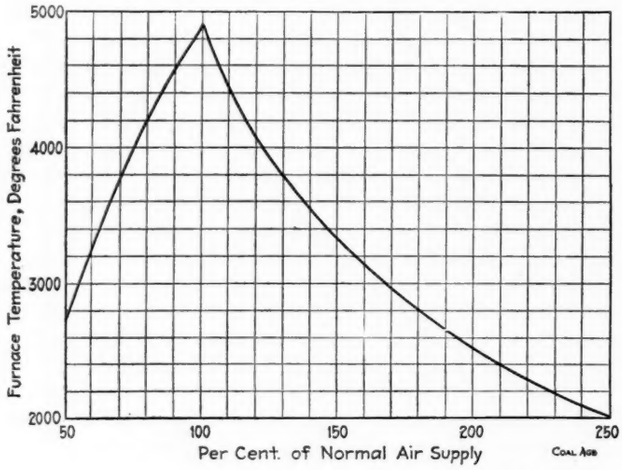


CHART SHOWING HOW TEMPERATURE OF COMBUSTION DEPENDS ON AIR SUPPLIED. TEMPERATURE IS HIGHEST WHEN AIR IS JUST SUFFICIENT FOR COMBUSTION OR 100 PER CENT.

consumed but a much larger current lowers the temperature of the furnace and wastes fuel. He explains how in some plants coal is lost by mixing with the ashes from the furnace and is wheeled out to the ashpit unconsumed. In other furnaces so much air leaks in through the furnace walls that the gases are cooled off and cannot heat the flues or the water tubes.

In this case "make a thin mixture of fireclay and stir cotton waste into it, first pulling the waste apart so that every fiber of it will be covered with the clay." Plaster this in the cracks and push it in with a calking tool. This will stay in place indefinitely. Then again bricks leak through their pores and a coat of paint will stop this leakage. But there are often large leaks which are not to be discovered without a candle or a torch. The boiler should be inspected for these especially around the boiler doors; only rarely are these tight.

Another loss is from leaving the furnace door open and excessive draft is yet another. There is a way of discovering the best thickness of coal to carry on the grates for a given draft. When you find it you can mark it on the furnace-door liners. The fire must be kept of equal depth all over, otherwise the air will pass through one part of the fire more rapidly than another and there will be too much air in one part with consequent temperature reduction. You can't keep down your excess air to the right figure if you have holes in your fire.

About 15 per cent. of carbon dioxide should be formed in good practice giving 38 per cent. of excess air. If less is found, air is being admitted without advantage, if more then there may not be, at least in parts of the fire, enough air for the monoxide of carbon to burn into dioxide, and much heat is lost because this final combustion is missed. If you could burn anthracite fuel without an excess of air you could get 20.7 per cent. of carbon dioxide but such a perfect result is unattainable. Bituminous fuel at best owing to the presence of hydrogen in the combustible material will not give more than 17 to 19 per cent. on complete combustion.

We recommend this book to those who are selling coal and who should understand combustion thoroughly if they would make satisfied customers. We commend it to mine operating forces because the study will enable them to save coal and make their boilers do more work and keep in order with little expense and attention. We suggest its purchase by firemen because they can save themselves from handling so much coal and wheeling out so much ash and because efficiency is always worth while. A fireman who reduces his work a quarter will certainly be awarded in ease of operation. As he will save that amount of fuel to his company, his wage will surely be raised if he is working for an appreciative management.

COAL-GAS RESIDUALS. By F. H. Wagner. XIV+179 pp., including index. 45 ill. Several tables. McGraw-Hill Book Co., Inc., 239 W. 39th St., New York. Cloth Boards. Price, $2.

This book fills a very present need, for it seems reasonable that coal-gas residuals and coke byproducts should be manufactured in this country. There are a number of products which have been mentioned as suitable to American enterprise, the manufacture of which in this country is far less feasible. The chemical industry is not one demanding a large amount of labor and the materials being at hand and seeking a purchaser almost in vain, are at a low price. Consequently it should be possible to meet foreign competition with profit and without the assistance of a tariff. The only difficulty is in the case of benzol. The low price of gasoline in America makes competition with this product difficult.

This book contrasts strongly with "Coal Tar Distillation and Working Up of Tar Products," reviewed in our issue of Feb. 21, as the subject is treated less from a severely practical and more from a chemical point of view. The first chapter treats of tar and the second of naphthalene ($C_{10}H_8$). This latter product has undoubtedly a great future, though at present it is a byproduct which is removed at an entire loss. It stops, by sublimation, the pipe connections in the distributing lines and so has to be removed if found in excess, even though it improves the quality of the gas. One per cent. of napthalene, says the author, raises the candlepower 25 per cent. It would seem that if some method could be discovered for injecting napthalene into natural gas it could be made as light-giving as the artificial product with or without the use of a mantle. It appears that napthalene has been used in France in an internal-combustion engine but no statement is made as to its success as a source of power in this connection.

Cyanogen (C_2N_2) is a profitable product and may be produced either by the Bueb or the Feld process. Of course, the amount obtained is dependent on the kind of coal coked but roughly 1.7 lb. will be obtained from a ton of coal. Small as this is, the author shows that a large plant will extract the chemical at a profit.

Of course, ammonia, treated in the fourth chapter, is the principal product. About 7¼ lb. of ammonia can be obtained per ton of coal, though there is enough nitrogen to make 48 lb. of product were there no losses in the conversion. About 28¼ lb. of ammonium sulphate can be manufactured from this ammonia. The writer in every case shows the costs of production of the materials but omits interest on plant, depreciation and obsolescence charges.

The writer quotes F. Puening, of the Koppers Co., stating that 2 gal. of benzol can be obtained from a ton of coal. This seems a small quantity, but were all the benzol saved which the coking of coal would produce, the output of the United States from this source would be 98,000,000 gal., or about 2⅓ million barrels. Owing to the war, the making of benzol is less attractive now than it was a few months ago.

Coal and Coke News

Washington, D. C.

There seems now to be a practical unanimity of assent that the forthcoming opinion in the renewed application of the Eastern roads in the 5 per cent. rate case will not be granted. This is reluctantly admitted by railroad managers, who are loth to concede that their hopes of an advance are not likely to be realized. Inasmuch as there seems to be such small chance of the granting of the roads' application as respects any commodities, the coal producers who have been fearful of the proposed increase in the past are now resting much easier. They do not believe that they are in any particular danger as things stand, being persuaded that the increase on coal asked for by the roads would hardly be granted even if there were to be an increase on other articles.

It is of considerable interest to note that the apparent indisposition of the Commission to allow any advance is due to the improvements in the revenues of the Eastern lines during recent months since the development of war in Europe. It had been stated as an argument in favor of the plan of reopening the case that the roads had been unfavorably affected by war conditions, and were in consequence unlikely to be able to endure the reduction of incomes to be expected. Hence the necessity of conceding to them, it was argued, an increase in the level of the rates.

Refusal to grant this advance now seems likely to be based upon the absence of a showing that the roads have suffered in actual income in consequence of the war. As to coal, it is being pointed out with considerable force that that article has been moving in undiminished quantity domestically, while exports have increased. The growth of exports has furnished export freight to the roads and has enabled them to improve their incomes from coal through increase in the density of traffic.

There is, it is argued, no reason in the coal situation for an advance in the charge made for transportation, since profits in the business are somewhat better than they were. Hence the attitude assumed with regard to the proposed advance of freight charges on that and other articles of like kind. It is the general impression that the agitation for an advance on coal is over for a good while to come.

Conditional Contraband

The British Government is taking decided steps to prevent contraband and conditional contraband articles from reaching Germany from the United States. Already a strong stand has been taken as regards copper and other articles, and it is understood a like position will be assumed with reference to coal if occasion demands. The position as to copper is embodied in a circular lately issued from the embassy and which it is understood will be paralleled in case of need by a similar document as to coal. In the copper circular it is stated that:

Information in possession of the British Government conclusively proves that very large shipments of copper, rubber and other commodities are passing through Italian ports on their way to Germany.

In New York large purchases of copper are being made by houses in Rotterdam, Amsterdam and Copenhagen who are working on German account. Directions are at the same time being given that these large consignments of copper are to be shipped through.

Meantime, official announcement is made here of arrangements between England and the Scandinavian countries for mutual observance of rights to neutral trade in noncontraband or conditional contraband articles, the list of which includes coal.

Getting Busy in Alaska

It is understood that the Interior Department is preparing regulations under which the exploitation of coal lands pursuant to the Alaska coal land leasing act may proceed.

The regulations are expected to cover a number of phases of the situation, and may require a good while in the process of working out. As soon as possible, it is understood the process of arranging to apply the act will be completed and arrangements will be made to begin operations in accordance with the law.

HARRISBURG, PENN.

Members of the Public Service Commission are highly pleased by the announcement from Washington that the Interstate Commerce Commission has reversed itself in the industrial railroad cases and decided that they may be given allowances. The Pennsylvania Commission had ruled in the Monongahela Connecting R.R. case from the Pittsburgh district that the industrial railroads or short lines were entitled to allowances for switching and other services, if they were really railroads.

The Interstate Commission, which had previously ruled the other way, came out during the past week with the decision that the industrial roads should have allowances restored.

The Public Service Commission on Nov. 7 heard the last of its dozen or so industrial cases, the point being to determine whether these carriers are really railroads.

The commission also heard the complaint of manufacturers of York and Lancaster that the rates for transportation of bituminous coal from the Clearfield region to those cities were discriminatory as compared with rates charged to Philadelphia and Harrisburg. The Pennsylvania R.R. defended the rates as reasonable, and was supported by counsel for the New York Central, Reading and Baltimore & Ohio.

PENNSYLVANIA

Anthracite

Hazelton—After being idle two months while the Beaver Meadow colliery of the Lehigh Valley Coal Co. was being modernized with new machinery and buildings, the 600 employees of that operation started work recently.

The fallacy of predictions of coal exhaustion is shown by the driving of a tunnel from the Buck Mountain to the Wharton vein in the Coleraine mine which, after yielding a fortune 30 years ago to W. T. Carter, of Philadelphia, was abandoned only to be reopened and reworked by his son who also retired wealthy. He let the coal rights pass to the A. S. Van Wickle Estate which has been extracting coal ever since. It is estimated that the new measures now being opened will give work for 15 years.

Tamaqua—Sixty men working in four-hour shifts recently saved Mart MacDonald, of Kaska William, from almost certain death after the man had been imprisoned in the No. 10 slope of the Mount Hope Coal Co., at St. Clair, for 8 hours. MacDonald, although uninjured, suffered from the cold and was placed under the care of Dr. R. T. Weaver, of St. Clair.

Sugar Notch—Maxwell No. 20 colliery, the largest operated by the Lehigh & Wilkes-Barre Coal Co., was thrown into idleness on Nov. 5, owing to the refusal of driver boys to work because one of their number did not receive pay for an extra hour. The boy demanded pay for this extra time, but the company foreman refused to hear his complaint.

Carbondale—The double frame dwelling house at the corner of Orchard and Green Sts., owned by Martin Kane, was badly damaged on Nov. 3 by a cavein at No. 1 mine of the Delaware & Hudson Co. The settling began at midnight and continued until 4 o'clock. At this hour the surface for 100 ft. square about the Kane property had dropped a distance of 5 ft. Other properties nearby were slightly damaged by water from bursting water mains.

Bituminous

Connellsville—It is reported that the coke production of the Connellsville region has dropped to approximately 200,000 tons per week, and the prospects are that it will go lower. Several blast furnace interests on the other hand have opened negotiations for Connellsville coke to cover their 1915 requirements. Efforts have been made to arrange for coke for the entire year on sliding scale contracts based either on pig iron average prices or trade journal quotations.

Uniontown—All efforts to check the fire which started Nov. 7 in the Martins mine of the Republic Iron & Steel Co., at Martins, having failed, the mine was flooded with water on Nov. 8 in an effort to extinguish the blaze. The damage so far is estimated at $10,000.

Monongahela—John Carroll, a mine foreman at the Shoenberger mine, recently entered a plea of guilty to a violation

of the mining laws by not taking certain precautions as prescribed at the mine door. He was fined $10 and costs.

Charleroi—Although the coal shipments for October passing through Lock No. 4 on the Monongahela River were larger than for many months, they did not reach the output from the river mines of 19,933,000 bu. for the month of October, 1913. Shipments through Lock No. 4 for October of the present year totaled 15,591,000 bu. of coal. The total passing through the lock in September was 14,739,000 bu.

Pittsburgh—Through the Pittsburgh offices of the Phipps properties a denial was recently made of the rumors of the exchange of several Phipps properties in a deal for coal land, the report having been that values amounting to $15,000,000 were involved. It had been extensively reported that the Fulton and Bessemer buildings, together with other holdings, were to pass to the hands of J. V. Thompson, of Uniontown, in exchange for large tracts of coal land.

WEST VIRGINIA

Bluefield—The Pocahontas Coal Operators' Association held its regular monthly meeting in this city on Nov. 5. This organization has a small auditorium and committee room on the sixth floor of the Law and Commerce Building. These have been newly furnished and serve well as a meeting place.

Goodwill—G. A. Bolden, assistant secretary of the West Virginia Commission of the Panama Pacific Exposition and N. E. Merhie, official photographer for the Commission, recently took a series of motion pictures of the Louisville first aid and mine rescue crew in action. This consisted of a demonstration given at the mine entrance. The crew was fully equipped with Draeger oxygen helmets and entered the mine after a supposed explosion, returning with a man apparently overcome by gas, also having some fractured bones. He was restored to consciousness by artificial respiration and afterwards given first aid.

Huntington—The West Virginia Coal Mining Institute dates of Dec. 9 and 10 have been changed to 10 and 11. President H. A. Zeller will shortly appoint a committee to arrange for the entertainment of the mine operators. The meeting is one of considerable importance and this year will no doubt have special significance owing to the depression in the coal business.

TENNESSEE

LaFollette—The employees of the LaFollette Coal, Iron & Ry. Co., who have been waiting nearly a year for payment of money earned Nov. 1 to Dec. 23, 1913, the company at that time having been placed in the hands of a receiver, were recently paid the amount due them by order of the United States court. Shortly after the appointment of the receiver 10 per cent. of back earnings up to $5 per man was paid.

KENTUCKY

Sebree—All the property of the Sebree coal mines, including machinery, tipple, tracks and mineral rights, was bought by J. D. Smith and J. W. Miller, of Birmingham, Ala., when it was sold a few days ago by the county commissioner. It is said that the purchasers are considering disposing of the property to other interests but that, should the deal not be consummated, they will reopen the mines the first of the year.

Owensboro—Receivership proceedings have been begun against the Fern Hill coal mines near here by T. A. Pedley, receiver for the Owensboro Savings Bank & Trust Co., who by this means seeks to protect the interests of the bank's creditors. Mr. Pedley alleges that the Fern Hills Mining Co., owner of the mines, is indebted to him in the sum of $935.55 and also for $30,000, represented by bonds and interest from Oct. 1, 1913. The court has not ruled on the question as yet.

Louisville—The Kentucky Mine Owners Association will hold a special meeting in Louisville on the evening of Dec. 3. One of the matters to be considered will be the raising of a fund to pay for the expenses the association has been put to in the matter of the Workmen's Compensation Act, it having retained attorneys from time to time to represent the association when the law was being prepared and since then, as progress has been made in applying it. The Court of Appeals is expected to hand down its decision on the law between now and the date of the meeting so that the members of the association will know where they stand.

Madisonville—Only three employees, the engineer, stable boss and pump man were left at work when the mines of the Nebo Consolidated Coal Co., at Circle City, were closed down for 60 days recently. No reason was given in the orders for suspension which were received from headquarters of the company at Louisville, where further inquiry failed to elicit explanation. This throws about 150 men out of work.

Madisonville—"Night Riders," or "Possum Hunters," have been active in the last few days in this part of the western Kentucky coal field. These lawless bands have been directing their efforts to drive negro miners from the western part of Hopkins County. At Carbondale 30 negroes formerly in the employ of the Carbondale Mining Co. failed to report for duty following an attack by "night riders" during which a negro child was shot and another wounded. On Nov. 3 two negroes were flogged at Daniel Boone. Here signs were posted ordering the negroes to leave. At Carbondale a wooden blockhouse has been erected and every night guards with high-power rifles watch for visits of the marauders. Another guard has been organized at Earlington while in other parts of the section the operators are taking similar precautions. Some operators affirm that the situation is serious enough to justify calling out troops but no one has appealed to the governor for them as yet.

OHIO

Cincinnati—Stock in several eastern Ohio and West Virginia coal companies, valued at $3,750,000, passed into the hands of John S. Jones, coal operator of Chicago, recently, as the result of an entry made by United States District Judges Warrington, Knappen and Denison, in a suit brought by the Government against the New York Central, and the Chesapeake & Ohio railroad companies, former subsidiary lines, and various coal companies controlled by them. The dissolution decree of the court was thus satisfied.

Martin's Ferry—The Elkins Coal Co., which recently leased and repaired the Buckeye mine, west of Bridgeport, and changed its name to the Locust mine, has released it to the International Coal Co., of Pittsburgh. It is expected that the new lessees will send a superintendent from their other workings to take the place of George Long, who has been in charge of the Locust mine under the Elkins company.

Coshocton—Coshocton operators and miners arrived at an agreement on the wage question at Coshocton Nov. 9. Both made concessions, but the terms of the agreement were not made public because they are subject to approval by the miners who will vote upon the contract this week.

Columbus—The new re-weighing rules promulgated by the Baltimore & Ohio R.R. have been put into force and B. F. Nigh, secretary of the Michigan-Ohio-Indiana Coal Association will wait to see how they work out before pushing the application for a change in re-weighing rules now pending before the Ohio Utilities Commission. The new rules provide for the weighing of cargoes at the nearest scales to the destination, which is a concession on the part of the railroad company. The old limit of 1000 lb. is retained, however. The application of the Coal Association provided for a limit of 500 lb.

INDIANA

Terre Haute—Thomas Archer recently asked $10,000 damages from the Otter Creek Coal Co., for injuries received while driving a mine mule. The jury, after a trial lasting several days, gave him $750.

Bureau of Mines Car No. 8 has left here for West Virginia under orders to stay there until July, in connection with a mining school. Car No. 3, in charge of Dr. August F. Knoefel and G. T. Powell, now at Evansville, will start on a training trip through the southern Indiana field. J. W. Paul, head of the government's mine rescue work, who stopped here on his way back to Pittsburgh from Royalton, Ill., where 327 men were caught by an explosion and all saved but about 50, said the bureau men worked 18 hours without stopping and with their breathing apparatus on all this time.

ILLINOIS

Percy—The mine near here, belonging to the Missouri & Illinois Coal Co., St. Louis, has closed down for an indefinite period of time. The output of this mine, for some years past, has been sold as company fuel to the M. & O. R.R. through a St. Louis coal company controlling most of the mines on the M. & O. Lack of business in the commercial field has compelled the St. Louis company to tighten up on outside coal and give their own product, as much as possible, to the railroad.

Murphysboro—The Big Muddy Coal & Iron Co. of St. Louis has bought the mine of the Gus Blair Big Muddy Coal Co., situated north of here on the M. & O. R.R. It was reported a few weeks ago that this mine would be abandoned on account of failure to obtain any further acreage. The Big Muddy people have, however, a tract of several hundred acres adjoining and it has been decided to purchase the Blair mine and work this acreage through the Blair shaft. Of the five mines in the Big Muddy field, three will now be controlled by the Big Muddy Coal & Iron Co., one by the

Gus Blair Big Muddy Coal Co., and the other by the Gartside Coal Co. of St. Louis. Another company formerly operating in this field, the Schmidgall Coal Co., abandoned its mine about two years ago.

Royalton—Operations were resumed Nov. 2 at the Franklin Coal & Coke Co.'s mine near here, which has not been operating since the recent disastrous explosion in which somewhat over 50 lives were lost.

Canton—The Mine Rescue Car, under the management of Messrs. Thomas Rogers and Thomas Trigg, has been moved to Dunfermline, where first aid and helmet work lessons will be given. The car was in Canton for approximately three weeks.

Springfield—It is stated by officers of the United Mine Workers that mine after mine has been closed throughout the state during the past two weeks and that the coal mining industry is decidedly disorganized. The conditions now facing the miners are said to be the worst in the history of the state exclusive of strike years. The general business depression existing throughout the United States is blamed as the chief cause of the bad conditions.

IOWA

Knoxville—The old Hawkeye mine, a short distance east of this city, and for many years the largest coal producer in Knoxville Township, has been permanently abandoned. The boilers and engines have been removed, and the rails and timbers torn out. During the past 16 years it is stated that over 750,000 tons of coal have been loaded onto the Rock Island tracks at Hawkeye.

FOREIGN NEWS

Edmonton, Alta.—J. T. Stirling, provincial inspector of mines for Alberta, reports that the coal mining industry of that province is at present in an unsatisfactory condition. In the Lethbridge and other Southern fields only about half the mines are working and they are on half time. Conditions are better in the Edmonton district, where the majority of the mines are fairly busy. The demand for coal this season has been light and the price has been lower than for some years, so that production at prevailing figures is unprofitable. As none of the dealers are laying in stocks a cold spell of any considerable duration may result in a shortage in the coal supply.

Glace Bay, N. S.—The production of the Dominion Coal Co.'s mines at Glace Bay and Springhill, N. S., for the 10 months ending with October is roughly stated at 4,071,000 tons as against 4,284,489 tons for the corresponding 10 months of 1913. While production at the Glace Bay mines has been curtailed owing to trade depression and the war, the output of the Springhill collieries, which have worked without interruption, has increased from 318,510 tons to 341,000 tons.

PERSONALS

Harry Dale, for many years past with the St. Louis Carterville Coal Co., and in charge of the Dale mine of that firm, has resigned his connection with the company and will engage in the mercantile business.

Joseph Pursglove and T. K. Maher, of the Pursglove-Maher Coal Co., have just returned from Logan County, West Virginia, where they inspected a piece of coal land. They are satisfied with the property and will probably close for it in the next two weeks.

Col. Harvey M. LaFollette, who was president of the LaFollette Coal, Iron & Ry. Co., at LaFollette, Tenn., prior to the appointment of a receiver on Dec. 23 last, and who has since been making his headquarters in New York, spent several days recently at LaFollette, Tenn.

H. C. Hequembourg has resigned as general purchasing agent of the American Locomotive Co., effective Nov. 15. It is not the intention to appoint a successor at this time, but until further notice the purchasing and storekeeping departments will be under the jurisdiction of Leigh Best, vice-president of the company.

John Whelan, Jr., formerly with M. A. Hanna & Co., of Cleveland, and general superintendant of the Massillon Coal Mining Co., of Massillon, O., has resigned these positions and gone with the Copen Creek Coal Co., as vice-president and general manager. This company has mines at Webster, Braxton County, W. Va.

W. P. Bross, general salesmanager for the Midland Coal Co., Kansas City, accompanied by U. A. Ralston, a salesman for the company in northern Kansas, is making a trip through the company's mines at Liberal, Minden and Pittsburg, Kan., for the purpose of learning how many cars can be expected for use this winter.

J. M. Roan, chief mine inspector of Ohio, was called to the Hocking Valley recently to settle a dispute over the weighing of coal at Mine No. 207 of the Sunday Creek Co. The company had been weighing the coal by building a bin under the scale and weighing the lump first and the fine coal second, with the same scales. This plan was approved by Mr. Roan.

Dr. W. A. Lynott, of Scranton, has recently been appointed a member of the medical and specialist staff of the Federal Bureau of Mines, by Doctor Holmes. Doctor Lynott was recommended for the position by a number of Philadelphia specialists with whom he practiced. He reported for duty on Nov. 1 at Pittsburgh and will have charge of the eye division of the medical bureau.

Erskine Ramsay, vice-president of the Pratt Consolidated Coal Co., was seriously injured, Nov. 7, suffering concussion of the brain caused by striking his head against the side of a barge. Mr. Ramsay, along with about 25 guests of the Pratt company, was at the shipyards at Holt, Ala., to celebrate the launching of the first barge by the company on the Warrior River. Mr. Ramsay stayed in the barge while it was being launched, and as it struck the water it tilted upward, throwing him against a beam. While his injuries are serious, it is stated that he will recover. He is one of the best known coal men and engineers in the country.

John Girdler, a coal dealer in Beverly, Mass., received congratulations Nov. 11, on the occasion of his one hundredth birthday. Mr. Girdler was born in Manchester, Mass., in 1814 and after an active business career in fitting out and managing vessels engaged in the Newfoundland fisheries he entered the coal business in Beverly in 1861 at an age when some men retire. He has since then been continuously in that business and on the same wharf, a prominent factor in the trade of that vicinity. Mr. Girdler enjoys excellent health and were it not for his slightly impaired eyesight he says he would be in as good condition as five years ago when he was giving close attention to every detail of his business. As it is, he stays at his office through the morning of each business day and takes a lively interest in market conditions and in what wholesale coal salesmen have to tell him. His friends wish him continued health and prosperity.

CONSTRUCTION NEWS

Ebensburg, Penn.—Active preparation for the manufacture of mine cars was recently begun at Colver. The shops of the company have been renovated and rearranged for that purpose, and some of the new machinery is already placed.

Massillon, Ohio—The Baltimore & Ohio R.R. has started to build a switch to Charlotte Mine No. 27 of the Massillon Coal Co. at Pigeon Run, which will soon be opened. Operations are expected to start Dec. 1 with 250 men.

Cleveland, Ohio—O. C. Barber, former "match king" and "millionaire farmer" of Summit County, is interested with Daniel Willard, president of the Baltimore & Ohio R.R. Co., in a Cleveland, Ohio, company which will spend more than $9,000,000 in reclaiming land and building vast coal and ore docks on the Cleveland lake front.

Floodwood, Ohio—The announcement is made by the officials of the Hocking Power Co., which is building a large power plant at Floodwood, that a portion of the plant will be completed by Dec. 1, when current will be sold. The work of constructing the service lines to carry the current to surrounding mines has been started. The company will furnish current to light 11 municipalities.

Buffalo, N. Y.—The Wickwire Steel Co. has filed with the Erie County Clerk a mortgage for $2,500,000 issued by the Bankers' Trust Co. of New York, the proceeds of which is to be used to enlarge its iron plant on the Niagara River between Buffalo and Tonawanda. A new wire works and byproduct coke plant are planned. The project is not new but it was supposed that nothing would be done till business revived.

West Union, W. Va.—The opening of new coal lands in various parts of West Virginia at present is calling for the construction of several railroads for the private use of the coal companies, which later may become a part of the general transportation system of the state. This has happened in a number of instances in the past, both in coal and timber land developments, and is usually a part of the plan of the companies in constructing new roads for private use.

Harlan, Ky.—M. P. Dotson, a capitalist of Wise, Va., and Pasadena, Calif., has been constructing a railroad from Ages to Evarts, a distance of about four miles. This road connects with the Louisville & Nashville at Ages. It is reported that it has been turned over to the L. & N., and that the engineers of this corporation will complete it. The finishing of this short line will open a market for some of the best coal in this field. It is thought that this is he beginning of a line that will connect with the Louisville & Nashville R.R., probably at either Big Stone Gap or at Appalachia, Va.

Huntington, W. Va.—C. W. McNulty, of Huntington, has been awarded the contract for the construction of the new central power plant of the Logan County Light & Power Co. at Logan. The building will be of fireproof construction throughout and the smokestack will be of brick 200 ft. high. Construction work will be started immediately and pushed as rapidly as possible with a view to having the power system in operation by Sept. 1, 1915. The turbines to be installed have already been contracted for and will have a capacity of 10,000 kw. The transmission line will extend to every mine in the Logan coal field with a total length exceeding 60 miles.

Fayetteville, W. Va.—The Virginian Power Co. is installing new electrical equipment in all the mines of the New River Co. The contract has been made with the central station company for a supply of alternating current, and the equipping of the mine with new machinery is under way. The equipment supplanted by the new electric power is to be sold. Two hundred and fifty and 550 volts have been standard in these mines since they were first electrified, and to save expenses these two voltages are being retained for haulage. The heavy pumping and ventilation equipment will be driven by 2300-volt current, and the lighting will be changed from 250 or 550 volts direct current to 110 volts alternating current.

NEW INCORPORATIONS

Joliet, Ill.—The Dermy Coal Co. has increased its capital stock from $100,000 to $200,000.

Cleveland, Ohio—The McCurtain Coal Land Co. has been organized with a capital stock of $50,000, to handle coal lands. Those interested are C. M. Horn, Paul J. Bickel, E. L. McCloskey, I. L. Evans and J. B. Putnam.

Nelsonville, Ohio—The B. R. Coal & Mining Co. has been incorporated at Nelsonville, Ohio, with a capital stock of $10,000. M. E. Pike, E. M. Patterson, F. W. Postle, A. L. Peters and Ralph Merchant are incorporators.

Fort Smith, Ark.—The Blue Ridge Coal Co., of Fort Smith was recently chartered with an authorized capital stock of $30,000. The officers are J. B. Jordan, president, C. E. Warner, vice-president, and H. P. Warner, secretary and treasurer.

East St. Louis, Ill.—One of the largest of the local coal carrying roads, the East St. Louis & Suburban R.R., has reduced its capital stock from $14,000,000 to $1,000,000, according to papers filed with the secretary of state in New Jersey. The company has reincorporated in Delaware with a capital of $12,000,000.

INDUSTRIAL NEWS

Columbus, Ohio—The report of the Hocking Valley Ry. for the month of September, 1914, shows a falling off of $51,000 in gross earnings from the figures of September, 1913. The net income was $169,634, or a decrease of $26,110.

Huron, Ohio—Supt. Gilmore, of the Wheeling docks at Huron, Ohio, is making arrangements for the accommodation of several lake freighters that will go into winter quarters at that place at the close of the navigation season.

Fayetteville, W. Va.—The Kanawha Coal Operators' Association recently held its annual session in Cincinnati, electing officers and discussing policies for the ensuing year. The reports of officers were heard and approved, the meeting being purely routine.

Louisville, Ky.—Delegates to the winter meeting of the Kentucky Mining Institute, which will be held here next month, will represent mines in which more than 30,000 miners are employed. The Engineers & Architects Club will hold joint sessions with the Institute.

Columbus, Ohio—Persons who have been given short weights in coal are requested to communicate the facts in the case to Fred C. Albrecht, sealer of weights and measures, and he will investigate all such complaints. This request is made to further the campaign against short weights claimed to be prevalent in many parts of Ohio.

Buffalo, N. Y.—The principal office of the J. B. Jenkins Coal & Coke Co. has been moved from Cincinnati to Buffalo by W. H. Hufstader, the vice-president, who left the Buffalo agency of the Pittsburgh & Buffalo Co. last year to take the new position. By the present arrangement the Jenkins company will sell the Pittsburgh & Buffalo company's coal in the Buffalo territory.

Sydney, N. S.—The Dominion Coal Co.'s combined collieries, Nos. 2 and 9, recently made a remarkable record. The ouptut of No. 2 for the single shift was 3961 tons, while No. 9 yielded 2087 tons. This made the combined total of 6048 tons for the shift. Both pits are worked by the same organization and the coal is hoisted through a common shaft. It is believed that but few mines in the world have ever passed the 6000-ton mark in a single shift.

Harrisburg, Penn.—The production of anthracite coal during October was heavier than that for October of last year despite the drouth which rendered mining difficult. The official statistics of shipments over 8 railroads announced by the Bureau of Anthracite Statistics, show 6,644,476 tons. The shipments in October of last year were 6,338,194 tons. However, production as a whole is still over a million tons less than during the first 10 months of last year.

Youngstown, Ohio—The establishment of a municipal coal yard in this city is being agitated by members of the city council, on the ground that such a business could supply fuel cheaply for city purposes, and could also take care of the annual charity coal distribution made by the city, as well as sell cheaply to the public. The plan has arisen in connection with charges made against a number of dealers of selling short weight, which have not so far been substantiated.

Jefferson City, Mo.—During the next four weeks the Public Service Commission will take charge of a test weight car operated by the Federal Bureau of Standards, and will test all master scales in the state and also every railroad scale. This will be the first governmental test of railroad scales in the state, and it is expected to lighten the troubles of the Commission from the continued complaints from shippers of coal both within and without the commonwealth as well as the consumers.

Lexington, Ky.—The output of the mines of the Consolidation Coal Co. in Letcher County is now between 70,000 and 90,000 tons a month as compared with from 90,000 to 110,000 tons for last year. The whole output for the country will be decreased probably from 200,000 tons, a normal average, to 100,000 tons monthly, until early spring, when, it is hoped, the market will open up again. All over the section the operators are relying on little besides domestic trade and have cut their production accordingly.

Toledo, Ohio—The Royal Collieries Co. has moved its general offices from Jackson, Ohio, to Toledo and is located at 1046 Ohio Bldg. E. W. Ervin is general and sales manager of the concern and Eben Jones, of Jackson, Ohio, president. The concern, which was recently reorganized, has mines in the Jackson Hill field of Ohio and also owns the Kentucky Gem mine at Offut, Ky. The concern also owns coal lands in that section and is planning to open up new mines which will triple the present output from the Kentucky fields.

Baltimore, Md.—Dismissing the suit of James C. Cobey and other stockholders of the Fairmont & Baltimore Coal & Coke Co. for the appointment of a receiver for that firm, Judge Dawkins in an opinion handed down Nov. 4 in the Circuit Court exonerates Alvin P., Howard and Irving Adams from all the charges made against them in the bill of complaint. It was alleged that the Messrs. Adams owning a controlling interest in the Fairmont & Baltimore Coal & Coke and other companies had conspired to defraud the complainant and the Fairmont company by selling coal mined by the latter to the Hamilton company at a price below market value. It was alleged that $30,000 had been lost which made the Fairmont company insolvent.

St. Louis, Mo.—Over 150 coal men of St. Louis and vicinity made a tour of inspection of the largest gas plant in the West, station A of the Laclede Gas Light Co., here, last Saturday afternoon, after which they were taken in a special train to the extreme southern limits of the city to view the huge new plant of Koppers byproduct retorts. The first battery of ovens is about completed but it will be the middle of the coming year before they will be put in operation. The entire party was taken back to the Century Boat Club where a banquet was tendered them and entertainment furnished. The inspection was made under the direction of the M. W. Warren Coke Co. of St. Louis, Western representatives of the Consolidation Coal Co., and the speakers of the evening were Secretary Woods of the Warren Co., W. F. Heinecke and E. J. Wallace of St. Louis.

Coal Trade Reviews

General Review

Anthracite marking time pending more seasonable weather. Bituminous operators becoming discouraged at the long delay in the expected improvement. Shortage in ocean freights.

The recent cold snap has caused a mild rush for hard coal and some difficulty is experienced in getting certain specific sizes but as a rule stocks are plentiful and the movement prompt. The current trade is showing a marked tendency to drag and the market lacks its customary fall snap. The situation hinges almost entirely on the weather, as is evident by the sharp activity in the dealer trade as a result of the recent low temperatures. Mine operations are still somewhat restricted.

Although the bituminous agencies continue optimistic as to the future, it is noted that many of them are beginning to question when the turn will occur. Some slight improvement was reported at certain isolated points during the week, but it is difficult to see any general movement in that direction. Spot business is at a minimum, while stocks continue at the maximum and with large volumes standing at some of the terminals, it is evident that much demurrage is accruing. Even the high grade coals which seldom suffer in a heavy market are beginning to feel the effects of the heavy pressure. But developments of a constructive nature are not entirely absent; some renewed inquiries for foreign shipments have developed and the market cargoes, so much in evidence recently, have been practically all cleaned up.

Ocean freights are looming up as an important factor in the situation. There is an authoritative estimate that the British Government has 1500 steamers under charter, which, together with the fact that practically all the German shipping is interned in neutral ports, has resulted in a shortage in vessel tonnage, causing a sharp advance in rates.

The current week witnessed a final winding up of Lake shipping out of the Pittsburgh district, and operations are down to 50% capacity; an attempt on the part of some of the producers to establish a new circular has met with only partial success. The closing of Lake shipping has caused a sharp restriction in Ohio also. With plentiful transportation facilities, and the surplus coal from the Lake trade, a demoralized market might be anticipated, but the situation has been unexpectedly well maintained so far. Prices are suffering and the production is much curtailed with many mines closing down entirely rather than flood the market. Southern operators are already beginning to anticipate the usual competition with the coals released from the Lake trade and prices are lower and very irregular. The fall business is so slow in opening up that the outlook is regarded as most discouraging.

A better tone to general business has created a more hopeful spirit in the Chicago market, and prices have been exceptionally well maintained in view of the adverse weather conditions. Considerable coal was shipped from the mines on consignment, in anticipation of colder weather, and this has proved a heavy burden to the market. Buying is confined more particularly to the domestic grades.

ATLANTIC SEABOARD

BOSTON

No change in the generally depressed market, although a better foreign demand is expected by some. New England stocks large. Pennsylvania coals on demurrage are offering at low prices. Georges Creek shippers secure some foreign business. Anthracite continues dull.

Bituminous—The week has developed no change in the generally depressed situation. A renewed foreign inquiry for special grades has encouraged a few of the shippers but the tonnage is relatively small and there cannot be said to be any favorable turn in prices at Hampton Roads. The Pocahontas and New River agencies have about despaired of finding any market coastwise for the present and the number of offerings the past few days has been noticeably less. A large volume of coal is still standing at all the terminals, the dumpings lately having been insufficient to materially reduce the accumulations of other weeks. Some heavy demurrage charges must have accrued during October.

Minimum prices continue to be heard, but the amount of spot business actually placed has been negligible. Stocks in this territory have been so large all season that with most plants it has been a physical impossibility to take on even the coal that was contracted for. The market cargoes lately offering at the various Eastern distributing points have now been practically all absorbed and delivered prices are somewhat steadier in consequence. Mills, however, are cancelling orders and the outlook for fall business is not encouraging.

There have been further reports of Pennsylvania shippers with distress coal on their hands at New York and Philadelphia. Prices on first-class Cambria County coals have receded to the lowest level since the slump in April, 1912, and it may be that quotations will drop still further. The dullness of the bunker trade has an unfavorable effect all over the market.

Georges Creek is sharing in some of the off-shore business that has lately come up, judging from the number of foreign ships at the Curtis Bay piers. The New England demand is as light for this grade as for all the others.

Anthracite—The cooler weather is expected to cause a better demand on the companies but at this writing the trade is unusually dull. Many of the anthracite barges are available for the bituminous trade.

Quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.85@1.45	$1.15@1.50	$1.67@1.77	
Philadelphia*.....	2.10@2.70	2.35@2.70	2.92@3.02	
New York*.....	2.40@3.10	2.65@3.05	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.....	.....	.....	.....	$2.50@2.75
Boston†.....	.....	.....	.....	3.45@3.73
Providence†.....	.....	.....	.....	3.30@3.68

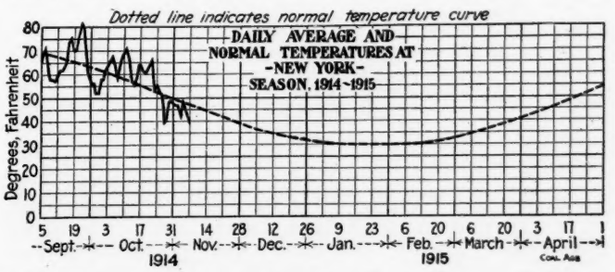
* F.o.b. †On cars.

NEW YORK

Bituminous still awaiting an improvement in basic conditions. Trade slow and heavy. Large stocks of anthracite on hand and business slow but the general tone is excellent.

Bituminous—The raising of the embargo at South Amboy toward the close of last week seems to be the only encouraging development in the local situation. Operators continue optimistic regarding the future, but many of them are becoming uneasy over the long delay. Undoubtedly the situation hinges on developments in industrial lines, more particularly steel, any improvement in which, will be quickly reflected on other industries.

An excellent bunkering trade is having a steadying effect upon the situation, one of the important companies engaged in this business reporting the largest tonnage in its history last month. This is accounted for by the heavy export movement of grain, which has reached to such proportions that vessel tonnage is relatively short and in urgent demand. The heavy orders from abroad for various manufactured articles



including munitions of war, are also having a beneficial effect, it being noted that some plants are going on full time operations and a few on double time.

The technical position of the market is quite favorable considering conditions. Supplies are plentiful but still within reasonable limits and though low prices are occasionally noted, it is evident that not much coal is coming down on speculation, operators holding their production down rigidly.

The market is quotable on about the following basis: West Virginia steam, $2.50@2.60; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The hard-coal trade has slowed up somewhat as the result of the long continued mild weather, but a few more seasonable cold snaps will soon readjust this phrase of the situation. At the present time the main objectionable condition in the anthracite trade is the large stocks which are the inevitable result of the record breaking production last month, and the light consumption incident to the mild weather.

Plenty of stove coal is available, for the time being at least, at the regular circular and it is now in as free supply as most of the other grades. A continuance of the recent cold snaps will also bring about an active situation on pea and egg coal, when the apartment house demand gets fully underway. Even as it is dealers are now experiencing a mild rush and this will be gradually accentuated as the season advances. As a rule the steam sizes are weak and in poor demand.

The New York hard-coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.00@5.35	5.30	4.90@5.30
Stove	5.35	5.35	5.30	5.30
Chestnut	5.60	5.45@5.60	5.55	5.30@5.55
Pea	3.55	3.45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.70@2.80	2.50@2.75	2.15@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.60@2.25
Barley	1.80	1.70@1.80	1.75	1.40@1.75

PHILADELPHIA

More seasonable weather creates an improvement in anthracite. Domestic sizes in good demand, and better call for steam grades. Bituminous trade still apathetic, with little prospect for any improvement.

Anthracite—More seasonable weather the past week brought calls from the house holders, which depleted the stocks of the dealers to the extent that there were increased calls on the wholesale operators. Stove and chestnut seem to be leading the van at present, while egg is showing a tendency to drag. Individuals are now concentrating their efforts to move egg at liberal concessions from the circular, and the large companies find themselves rather hard put to get rid of this size, in conjunction with the others. There seems to be a better call for pea, buckwheat and rice, particularly the former. This indicates that the small house holder is coming into the market, as pea coal is looked on as a domestic fuel, and is used largely for that purpose.

Prices at Tidewater about as follows:

	Circular	Individual
Broken	$4.75	$4.60 @ 4.70
Egg	5.00	4.65 @ 4.75
Stove	5.00	5.10
Chestnut	5.25	5.00 @ 5.10

Bituminous—Nothing favorable occurred during the past week that could be construed into the supposition that the bituminous trade was on the upward trend. Prices still continue low, even for the better varieties, with the demand considerably less than the supply. Extended cold weather may create a better demand, but the industrial depression continues, and improvement along these lines is the only salvation.

BALTIMORE

Colder weather creates a better feeling in anthracite. Soft coal conditions not at all satisfactory. Prices on the better grades are suffering.

More seasonable weather has come to aid the hard-coal dealer. Many householders have been forced to buy and most of the dealers have received fair orders the past week. The stocks on hand remain liberal, however, and in addition a prompt movement is reported. Some dealers have trouble in getting through special sizes as desired, but it is at no time serious. From now on about an average winter, or perhaps a little better than average, should be experienced by the hard coal dealer, though lack of employment that has hit many small homes may make some difference.

There is not much encouragement in the bituminous situation. Operating interests of West Virginia, Maryland and Pennsylvania all report a poor demand for fuel of all grades. In the past the better coals have usually held up in periods of stress, but the present depression has apparently hit all about alike. West Virginia three-quarter gas coals are selling around 85c., with slack about 50c., this latter being the only grade to show a gain in the past two or three weeks. Western Maryland coals are offering to the trade at from 75 to 85c. Pennsylvania off qualities are on the market at from 95c. to $1.10. Best coals are still maintained around $1.35 to $1.40.

HAMPTON ROADS

Movement for the week shows up well. No change in prices. Total dumpings for October 981,507 tons.

Dumpings over the piers at Hampton Roads for the week show up well. Some large cargoes have gone coastwise and the foreign movement has been good. Although Custom House records showing foreign clearances are not available it is understood that some heavy cargoes have gone to Rio de Janeiro, Montevideo, Genoa, Naples, Cardenas, and Port of Spain. Even though there is still a small excess of coal on hand above normal, suppliers are making no reduction in price on any of the various grades and there is no prospect of any cut being made; in fact the outlook is for a heavy movement during November and there may even be a slight advance in price on some of the grades.

The total dumpings at Hampton Roads piers for the month of October amounted to 981,507 tons of which quantity the Norfolk & Western dumped from Lamberts Point 436,647 tons, the Chesapeake & Ohio Ry. from Newport News 295,926 tons and the Virginian Ry. at Sewalls Point 248,934 tons. A comparison of figures for October of this year with the same month of last year shows that both the Virginian and Norfolk & Western fell down somewhat in their dumpings while the Chesapeake & Ohio made a fair gain. The total dumpings for October 1914 are about ten thousand tons ahead of the movement for the same month last year and although this gain is small there is some satisfaction in knowing that it was made under very different market conditions from last year.

OCEAN FREIGHTS

British Government believed to have 1500 steamers under charter. Vessels scarce and rates advancing rapidly, with the market hardly quotable.

It is almost impossible to quote rates on coal from this country to foreign ports with any degree of accuracy at the present moment, as the freight market is advancing daily owing to the increased demand for steamers for grain, general cargo, time charter, etc., and the scarcity of available November tonnage. We believe that the British Government now has under charter 1500 steamers.

Mediterranean rates we would quote at from $4.80@6, but owners favor grain under present conditions. Early last week we had a neutral steamer offered for coals from a United States port to Montevideo at $3.72, which was a very reasonable boat on the market, but since then the Dutch steamer "Hercules," 1372 tons net register, has been chartered to load coal at Baltimore for River Plate at $4.08. To the West Coast of South America, steamers are available at reasonable figures, as a few owners desire to place their boats in this position, and we would quote the rate to Valparaiso at $4.32, with 750 tons a day for discharging.—W. W. Battie & Co.

COAL CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Sunlight		Baltimore	Calais	349	
Mary F. Barrett		Baltimore	Galveston	1564	
Geo. H. Ames		Norfolk	Savannah	378	
Isle of Jura	British	Baltimore	Genoa	2485	
Dustin G. Cressy		Baltimore	Mayport	726	
Chas. H. Klinck		Philadelphia	Biddeford	4444	$0.95
Nonetta M. Porcella		Baltimore	Bangor	466	
Thomas H. Lawrence		Philadelphia	Rockland	323	0.90
Farmand	Norwegian	Philadelphia	Caribbean	861	
Margaret Haskell		Baltimore	Portsmouth	1870	

Note—Steamers are indicated by **bold face** type, all others being schooners.

LAKE MARKETS

PITTSBURGH

Some sellers have named new circular prices at $1.20 for mine-run, 10c. reduction from last season's prices, and are openly quoting prompt at a further reduction of 5c., but with scarcely any buying at any price. Lake shipments about over. Operations at not over 50% with prospects of 25 or 30% within a fortnight.

Some of the operators have announced new season prices, but others have refused to do so, regarding present conditions so poor that no circular could be maintained, and they are nominally quoting on the old basis—$1.30 for mine-run—expecting to name real prices about Apr. 1. The new schedule as announced by some operators is as follows: Slack, 85c.; nut and slack, $1.05; nut, $1.15; mine-run, $1.20; ¾-in., $1.30; 1¼-in., $1.40. For spot lots they are quoting 5c. less on mine-run and screened coal, but do not name corresponding

prices on slack and nut, prompt quotations being: Mine-run, $1.15; ¾-in., $1.25; 1¼-in. $1.35. There is no inquiry for contract coal so that the prices are practically nominal. As to prompt, there is occasional buying in a small way, but it is not probable that the prices quoted will generally obtain in the market during the next few weeks, because of the large surplus of productive capacity.

Slack for prompt shipment has continued to firm up, with the approaching end of the Lake shipping season, and in the past few days it has been firm at 60c., although selling at 50c. a fortnight ago and at as low as 40c. a month or six weeks ago.

This week has seen practically the end of shipments in the Lake trade, though a few belated lots may go forward next week. The insurance expires Saturday, Nov. 21.

The Pittsburgh district is operating at an average rate of not over 50% at the outside, and many mines are closed entirely or operating only one or two days a week. Within a fortnight production is likely to be down to 25 or 30% on account of the cessation of Lake shipments. There is a slight improvement in domestic demand, but the manufacturing demand is tapering off still more, and is not more than 50% of normal.

BUFFALO

Tone of the bituminous market not improved. Mines running very slow. Small prospect of activity this fall, on account of heavy overstock. Anthracite doing well.

Bituminous—Some operators in the Allegheny Valley state that they are now running scarcely more than two days a week and that it is difficult to sell even this reduced output. This is an extreme view of the situation, but it shows how deep the despondency is. But in spite of all this the bituminous trade is making a little money, at least where it is possible to mine the coal at moderate cost, and for that reason the operators refuse to take the off-hand advice of disinterested friends and shut down for the winter. They know full well that the working capacity of the bituminous mines is far beyond the needs of the country but it only takes a short period of car scarcity to advance prices and put them on their feet again.

So the output is kept up to the limit of the consumers' storage capacity in anticipation of the inevitable swing of the pendulum to the other extreme. In the meantime there must be waiting as there is considerable coal on track yet. Quotations are kept as near the spring circular as possible, some coal still selling on the basis of $2.80 for best Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with slack more active of late than sizes. Allegheny Valley sizes are quoted 25c. lower than Pittsburgh.

Anthracite—The trade is fair, perhaps even better than should be expected, considering the very warm weather so far this fall as indicated by our temperature charts.

The Lake movement keeps up well, considering the amount already on the Upper-Lake docks and it looks as if the shippers would go on till the lakes are closed by ice, as they usually do. Shipments for the week, according to the custom-house report, were 120,000 tons, covering ten receiving ports, which shows that the smaller Lake towns are laying in their last supply for the season from that source.

TOLEDO

Warm weather causes a restriction in the trade. Market heavy, but a better feeling prevails.

Warm weather has again caused a relapse in the domestic coal trade, which had improved materially during the brief cold spell. The steam trade has not been greatly improved, although dealers are hopeful that conditions will be better in a short time. Lake business continues, though it is far from being as heavy as it should be at this season of the year. There is no coal on track in this section, as it has practically all been cleaned up. Prices remain the same, but dealers seem to be holding closer to the list.

CINCINNATI

Continued mild weather has prevented a revival in domestic business. Steam demand still weak owing to industrial conditions. Prices holding well in view of the adverse conditions.

This section has been experiencing probably the mildest fall weather for several years. As a result few domestic consumers have as yet felt any need for fuel, and those who postpone their buying until cold weather are yet to be heard from. This fact, in connection with the practical certainty that most of the smaller dealers are not at all heavily stocked, makes it probable that the next cold snap will revive the domestic market very sharply. This will also help the steam business somewhat as there has been little call for screenings for heating purposes so far.

As to industrial demand there is practically none. The few manufacturers who have benefited by the war are greatly outnumbered by those whose foreign markets have collapsed entirely, and the industrial depression seems to be unimproved. Considering these conditions, prices are holding up very well indeed, the amount of distress coal offered being unexpectedly small.

CLEVELAND

Coal on track at the opening of the week aggregated 500 cars with a limited market, but no cutting of prices. It will take a week to clean up the market. The retail trade continues good.

Receipts over last Sunday, with what coal was carried over, amounted to 500 cars, mostly slack. The Pennsylvania R.R. had 260 cars; the B. & O. 150; the Big Four, 40; the Nickel Plate, 20; and the Wheeling 30. Not to exceed 60 cars were coarse coal. Operators and jobbers last week filled up the local trade and the market was limited as a result.

Very little of the coal on track was consigned. Most of it was brought in on contract or sent in to clean up mine tracks where Lake coal is being made. This week practically closes the Lake shipping season and jobbers and operators are working to divert shipments to northern Ohio markets away from Cleveland.

Panhandle, Youghiogheny, Goshen, Cambridge, No. 8 strip vein from Ohio mines, West Virginia No. 8, Fairmount, Hocking, and Pomeroy slacks were on track. Hocking was held at $1.50, which has been the current price for the last few weeks, while the others were quoted at $1.65 to $1.70.

The domestic trade is holding up well and sales are steady, but not of real winter proportions. Pocahontas and other prepared coals are not easily obtained. They are held firmly at quotations and there is enough demand to absorb the present production.

The Northwestern Fuel Co. shipped its last coal from Lorain and Toledo this week and will use only one boat for storage coal. Most ships leaving Lake Erie for Upper Lake ports are carrying storage coal. There is less coal being shipped now than in the middle of July and there is nothing to indicate there will be the customary rush the last two weeks.

Quotations for shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.75	.....	.....	.....	.....
Lump, 6 in.	.....	.....	$2.45	.....	.....
Egg	3.75	.....	.....	.....	.....
Egg, 6 in.	.....	.....	2.10	.....	.....
Lump, 1¼ in.	.....	$2.40	2.25	.....	.....
Lump, ¾ in.	.....	2.30	2.10	$1.95@2.00	$1.95@2.00
Mine run	2.75	2.25	1.95	1.85@1 90	1.90
Slack	2.40	1.65@1.70	1.65	1.65	1.65

COLUMBUS

Mild weather and the final slowing down in the Lake trade has caused a further slump. Steam business is still quiet and the market will be a weather proposition from now on. Small sizes are growing stronger.

The coal trade in Ohio is quiet. The domestic demand is small, due to continued warm weather, and the steam business is also slow. This, coupled with the fact that the Lake trade is nearing the end, appears to affect every phase of the market. Prices are suffering and the prospects for the future are not as bright.

Production is being considerably curtailed by the high temperatures and lack of steam demand, and many mines have been closed down almost entirely. On the whole the production in the Hocking Valley has been about 65% of the average, and in the strictly domestic fields even lower. Jackson and Cambridge reports not more than 40%, and in the Pomeroy Bend field the output is about 75% of the average.

Lake trade is on its last legs. The greater part of the final shipments are now loaded, and while some coal will be put on vessels for storage up to Dec. 1, this will not be sufficient to affect market conditions to any extent. The docks of the Upper Lake ports are congested and the interior movement is not large. The Lake season was not a good one from any standpoint.

Steam business is slow in every way. Buying on the open market appears to be one of the rules, and contracts are not being readily renewed. Railroads are taking a larger tonnage.

Prices in the Ohio field are:

	Hocking Valley	Pomeroy	Kanawha
Re-screened lump	$1.55	$1.65	.....
Inch and a quarter	1.50	1.55	$1.40
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.10	1.10	1.10
Nut, pea and slack	0.35	0.40	0.35
Coarse slack	0.25	0.30	0.25

COKE

CONNELLSVILLE

No current transactions of note, but some inquiry for next-year furnace coke. Prices unchanged, with production and shipments decreased further.

Practically no furnace coke sales have been made for November. Three or four inquiries have developed for first half or all of next year, and as low as $1.70 is claimed to have been quoted for the six months. Nearly all contracts expire with this year, but consumers are not likely to be in a hurry to make fresh contracts. We continue to quote: Prompt furnace, $1.60; contract furnace, $1.75; prompt foundry, $2.15@2.50; contract foundry, $2.35@2.50, per net ton at ovens, the contract quotations being for the very best grades.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Oct. 31 at 205,964 tons, a decrease of 23,555 tons, and shipments at 207,004 tons, a decrease of 7128 tons.

BUFFALO

Little doing in coke, as the furnaces are running slow and many are shut down.

Prices are supposed to be at the bottom, where they will remain till there is a genuine stir in iron. It is expected that a revival will take place as soon as the lull has lasted long enough to permit business in general to take a long breath. Predictions of wholesale failures are not now heard and the European war cannot prevent us from consuming a large amount of iron. Coke prices remain on the basis of $4.25 for best 72-hr. Connellsville foundry, with stock coke $3.30.

BIRMINGHAM

There is absolutely no business being done in furnace coke, and foundry coke is in only slightly better demand.

CHICAGO

Coke is quoted at: Byproduct, $4.95; Connellsville, $4.75@4.90; Wise County 72-hr. (select), $4.25; gas coke, $4.25; furnace coke, $4.40@4.65.

THE STEEL INDUSTRY

Shrinkage in production continues, and November output will show a scaling down from October. Our pig-iron statistics show how the industry has been receding. In October, production was 1,783,045 tons, or 57,518 tons a day, against 1,882,577 tons in September, or 62,753 tons a day. The October rate was the smallest since January, 1911. The net loss in active furnaces in October was 18, there being 158 in blast as November opened, with 53,253 tons daily capacity, against 176 furnaces and a daily capacity of 60,427 tons one month previous. Many steel works furnaces have been blown out and the recent increases in pig-iron stocks of the steel companies are likely to add more furnaces to the idle list. Export trade in wire products is still good and there is fresh inquiry for barb wire. Horseshoe works will be able to run full until February on European orders.—"The Iron Age."

SOUTHERN

LOUISVILLE

Lake trade closing down, and this coal will soon be diverted to the Kentucky markets. Prices lower and very irregular.

The improvement in the domestic demand, due to the low temperatures two days in succession, was only temporary. Industrial requirements seem to be even less than heretofore, while the shipping season on the Great Lakes is closing, and coal which was required there will soon begin to compete in Kentucky markets.

Prices are irregular and probably even lower than in October. This is accounted for by the fact that operators who have contracts for their high-grade coals are being forced to give their screenings away to get rid of them. The range of prices is very wide and is governed by the exigencies of each shipper's case and the conditions he has to meet. Lump coals are selling anywhere from $1.50 to $2.35, round from $1.10 to $1.75, and screenings all the way from nothing to 25 and 30c. and on up to 65c., according to grade; all prices are f.o.b. mines.

BIRMINGHAM

Lump market slightly improved but steam business is quiet. Bunkering trade a disappointment.

The past two weeks has shown little change in the Birmingham coal market. Business on lump coal may be a shade better, but the demand for steam fuel is so quiet, that it handicaps filling lump orders. While some steam coal is being shipped to Gulf ports for bunker purposes, this tonnage is not as large as had been expected, and the Birmingham operators are rather discouraged over this fact.

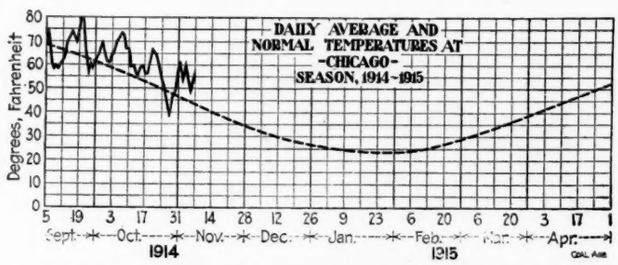
Many of the mines are closed down, and few are working more than three or four days per week. Blacksmith coal is holding its own; this grade has been more uniform both in price and demand for the past twelve months than any other grade, quotations ranging from $2 to $2.25 per ton f.o.b. mines for the better qualities. No immediate improvement is in sight on the lump and steam business.

MIDDLE WESTERN

CHICAGO

General dullness prevails. Summer weather lessens demand for domestic sizes. Anthracite market quiet. Prices of screenings rising, due to smaller production.

The only encouraging feature in this section during the past week has been the improvement in the demand for steam coals. This symptom of better conditions, which everybody in the trade is hoping for and which bids fair to lead to further advances in the near future, is said to be due to two causes. First, a material reduction in shipments, largely due to operators unloading screenings at the mines to be reloaded later when market conditions warrant. Second, a better tone in general business conditions in the Central West. Several manufacturers, particularly in Chicago and St. Louis, report the receipt of large orders for goods from foreign sources, and some idle plants have recently been reopened.



Chicago yards are full of coal, but a cold snap of any duration would soon change the situation radically. The colder weather only continued for a few days and made but little impression on the domestic trade. Prices for domestic sizes are holding astonishingly firm considering the weather conditions. Eastern coals seem to have benefited more from the fitful spell of cold weather last week than others, but have again resumed their former listlessness.

Franklin County coals have somewhat weakened this week; there is an over-supply of all sizes, and some coal has been moved at prices ranging from 15 to 20c. per ton under list.

There has been some reduction from circular quotations in the price of anthracite, but the tonnage moved is relatively small.

Prevailing prices are as follows:

	Franklin Co.	Springfield	Harrisburgh	Sullivan	Clinton
Lump	$1.75	$1.50@1.75	$1.50@1.75	.....	$1.40@1.75
4-in. lump	.....	.....	.....	$1.50@1.75	.....
Steam lump	.....	.....	.....	.....	1.20
2½-in. lump	.....	.....	.....	1.35@1.60	.....
1¼-in. lump	.....	.....	.....	1.25@1.35	.....
Mine-run	.....	.....	1.10	.....	1.10
Egg	1.60@1.75	.....	1.50@1.75	.....	.....
6x3-in. egg	.....	1.35	.....	.....	.....
Nut	.....	1.30	1.40@1.75	.....	.....
No. 1 nut	1.60@1.75	.....	.....	.....	.....
Screenings	0.50@0.75	0.35@0.75	0.40@0.75	0.45@0.65	0.35@0.50

Hocking Valley 1¼-in. lump, $1.40@1.60; mine-run, $1.25.

New River and Pocahontas lump and egg, $2.25; mine-run, $1.35@1.40.

Somerset Smokeless lump and egg, $2.15@2.25; mine-run, $1.20@1.40.

INDIANAPOLIS

Indiana trade more cheerful. Some factories reopening and others are increasing forces. Mild weather makes a very poor market for domestic grades. Mine operations generally unchanged.

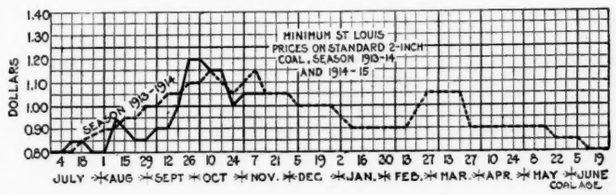
The weather is much against the trade. With the temperature well above normal as noted on the accompanying charts, the trade and prices are about on a par with the summer level. Slack has improved considerably, No. 4 selling at 80 to 90c. and hard to get on account of the light output of lump. Buyers who would ordinarily be taking eight to ten cars at a time at this season of the year are now ordering only two to three cars. The money situation has tended to reduce the size of orders and trading is largely on a cash basis.

The running schedule of mines has not changed much. Most of them are making half-time but some are doing better. The competition in the open market is keen, with resultant low prices made on occasions. Railroad buying is only moderate. There is considerable slowing down in the demand for coal from the large buildings in cities, the necessities being small in warm weather. These purchases are about one-third of what they are in normal fall weather. Buyers offer the minimum price for the free coal now on the market.

ST. LOUIS

Prices seem to have touched unirreducible minimum. Considerable coal on consignment. Number of mines shutting down.

The local market is practically at a standstill. Prices seem to have gone as low as possible and summer conditions exist. The only improvement the past week was in high-grad screenings, which increased a little in both price and demand. Not only is the steam market demoralized, which has been the case now for several weeks, but the domestic trade is also in a somewhat deplorable condition.



Anticipating cold weather, several of the operators shipped coal to different reconsigning points, with the result that there is an unlimited amount of coal on consignment. Continued warm weather has caused the retailers to shut off purchasing almost entirely; they are unable to take any of the coal, even at prices far below what that now in their bins cost them.

The prevailing wholesale prices are:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.30	$1.05@1.10	$1.15@1.20
3-in. lump	.....	....	1.40	....	.....
6-in. lump	$1.40@1.75	....	1.50	1.25@1.35	1.30@1.35
Lump and egg	1.85@2.15	$2.25	.....	....	1.35
No. 1 nut	1.30@1.45	....	.....	0.75@0.80	.....
Screenings	0.40@0.50	....	0.80@0.85	0.15@0.25	0.20
Mine-run	1.05@1.10	....	.....	0.75@0.80	.....
No. 1 washed nut	1.50@1.60	2.25	1.60	....	.....
No. 2 washed nut	1.25@1.35	....	1.35	....	.....
No. 3 washed nut	1.05@1.15	....	.....	....	.....
No. 4 washed nut	0.95@1.05	....	.....	....	.....
No. 5 washed nut	0.20@0.25	....	.....	....	.....

Retail prices are: Franklin County and Carterville, $3.50; Mt. Olive, $3; Standard, $2.75; Pennsylvania chestnut, $8.50; egg and stove, $8.25; grate, $8; Arkansas anthracite, $7; West Virginia smokeless, $6@6.50.

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

Anthracite shipments for September and the first nine months of this year and last year were as follows:

	September		9 Months	
	1914	1913	1914	1913
Phila. & Reading	1,092,056	1,232,367	9,961,608	10,736,917
Lehigh Valley	1,391,144	1,162,850	10,941,943	10,834,778
Cent. R.R. N.J.	892,386	906,525	7,452,435	7,701,931
Del. Lack. & West.	990,570	895,252	8,128,793	8,253,236
Del. & Hudson	678,104	625,049	6,032,697	5,928,124
Pennsylvania	611,593	593,800	5,308,918	5,204,132
Erie	773,866	709,400	6,943,394	6,828,702
Ont. & Western	214,757	212,951	1,942,269	2,132,259
Total	6,644,476	6,338,194	56,712,057	57,620,079

SOUTHWESTERN TONNAGE

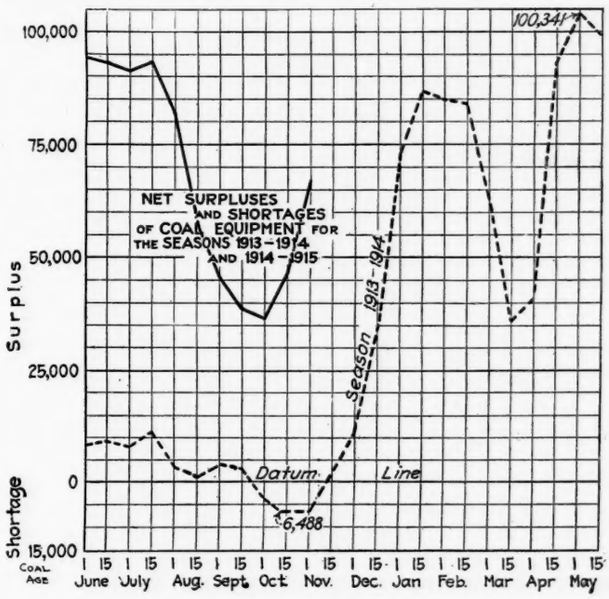
The following is a comparative statement of the Southwestern tonnage for February and March of the years 1913 and 1914:

State	February		March	
	1913	1914	1913	1914
Missouri	260,586	259,270	259,270	263,593
Kansas	414,413	492,304	492,304	501,841
Arkansas	130,888	113,354	113,354	165,037
Oklahoma	297,004	257,162	257,162	296,484
Totals	1,102,891	1,122,090	1,122,090	1,226,955

This statement only covers the tonnage of members of the association, which is estimated to be at least 95% of the entire production.

THE CAR SITUATION

The net coal car surplus on Nov. 1 was 67,345 as compared with 46,635 on Oct. 15. Detailed statement arrived too late for publication in issue and will appear next week.



FOREIGN MARKETS

ENGLAND

Trade heavy and unchanged. Vessel rates stiffen up.

The London coal trade continues slow. Prices are stationary, but with a tendency downward. Factories have bought for forward deliveries rather more freely, but the depot trade is weak.

Dear tonnage and high freights continue to act as a drag upon trade. On the Tyne this burden is acutely felt, the volume of business being very limited.

During the week the Miners' Federation of Great Britain has discussed the question of the relief of soldiers' and sailors' dependants, and the necessity for a state scheme dealing with unemployment, which is becoming serious.—"Colliery Guardian."

Oct. 23—Strong conditions are well maintained and there is a great scarcity of Admiralty List descriptions for early loading. Dry coals also are not easily obtainable, but Monmouthshire large and Cardiff smalls are in ample supply at present. Quotations are approximately as follows:

Best Welsh steam	$5.04@5.28	Best Monmouthshires	$4.02@4.08
Best seconds	4.56@4.80	Seconds	3.84@3.96
Seconds	4.38@4.50	Best Cardiff small	1.86@1.92
Best dry coals	4.92@5.16	Seconds	1.20@1.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage and for cash payment.

Freights—Chartering is fairly active and rates steady at approximately the following figures:

Gibraltar	$1.68	Venice, Ancona	$3.00	Singapore	$2.64
Malta	1.68	Alexandria	2.40	Las Palmas	1.68
Marseilles	1.76	Port Said	2.28	St. Vincent	1.80
Algiers	1.56	Aden	2.40	Rio Janeiro	2.94
Genoa, Savona	1.86	Colombo	2.46	Monte Video	2.52
Naples	1.92	Sabang	2.46	Buenos Ayres	2.76

Coal Contracts Pending

Contract No. 4—Boston, Mass.—Rhode Island Co. is in the market for 90,000 to 100,000 tons of Pocahontas, New River, Georges Creek, or Somerset run-of-mine. Shipments are to be made in about monthly proportions for a year, and the point of delivery is Providence, R. I. All communications should be addressed to J. H. Sanford, Purchasing Agent, New Haven, Connecticut.

Contract No. 6—New York—The Connecticut Co. is in the market for 22,000 tons of a good grade, low volatile, low ash, low sulphur bituminous coal for 10 months, Nov. 1, 1914 to Sept. 1, 1915. Shipments are to be as required f.o.b. boats, to be placed by the company at New York loading ports. Bids should be submitted to J. H. Sanford, Purchasing Agent, New Haven, Connecticut.

Contract No. 7—Zylonite, Mass.—The Berkshire Street Railway Co. is in the market for 21,000 tons of a good grade, low volatile, low ash, low sulphur bituminous coal for 10 months, Nov. 1, 1914 to Sept. 1, 1915. Shipments are to be as required and price to be made f.o.b. cars at mines for Tunnel Power plant at Zylonite, Mass., B. & A. R.R. Bids should be submitted to J. H. Sanford, Purchasing Agent, New Haven, Connecticut.

Contract No. 8—Portland, Ore.—Proposals for furnishing and delivering about 5000 tons of bituminous coal for use on the Dalles-Celilo Canal construction work will be received at the U. S. Engineers' Office, Portland, Ore., until 11 a.m., Nov. 27, and then publicly opened. All communications should be addressed to Major of Engineers, Jay J. Morrow, U. S. Engineers' Office, Portland, Oregon.

Contract No. 9—Fort Wayne, Ind.—The Municipal Light, Heat & Power Co., of Fort Wayne, is in the market for 20,000 tons of screenings. Deliveries are to be made in hopper bottom cars during the next year. Address the Municipal Light, Heat & Power Co., Fort Wayne, Indiana.

Contract No. 10—Chicago, Ill.—The Chicago Coated Board Co. is in the market for 300 tons of screenings per day. Deliveries are to extend over a period of one year, and to be made at Chicago, Ill. Address the Chicago Coated Board Co., 420 E. North St., Chicago, Illinois.

Contract No. 11—Portland, Maine—The Portland Gas Light Co. is in the market for 30,000 tons of Penn Gas, Westmoreland, or any good grade, three-quarter screened, gas producing coal for delivery between Mar. 1, 1915 and Mar. 1, 1916. Shipments are to be as required, about in equal monthly proportions, to wharf through one bridge, Portland, Maine, ample water alongside. All communications should be addressed to C. H. Tenney & Co., Managers, 201 Devonshire St., Boston, Massachusetts.

Contract No. 12—New York—The National Guard of New York is in the market for 2600 long tons of anthracite buckwheat No. 1, for use at the various armories in the Boroughs of Manhattan and the Bronx. Prices quoted should be delivered. Security aggregating 30% of the total amount involved in the contract will be required, together with an initial deposit of 1½% of the amount bid. Bids will be received at the office of the Mayor, City Hall, until 3:30 p.m., Nov. 16. All communications should be addressed to Armory Board, Room 6, Basement, Hall of Records, Manhattan, New York.

Contract No. 13—New York—Sealed bids or estimates are requested by the Department of Water Supply, Gas and Electricity for furnishing, delivering, storing and trimming coal. Security aggregating 30% of the total amount involved in the contract will be required, and the bidders should state the price per unit for each item contained in the specification. Different sections of the contract run to Dec. 31 of the current year, and to July 1, 1915. The bids will be received until 2 p.m., Nov. 16. Copy of the contract and specifications can be had on application to the Department. All communications should be addressed to William Williams, Commissioner, Department of Water Supply, Gas and Electricity, Room 2351, Municipal Building, Borough of Manhattan, City of New York.

Contract No. 14—Panama, C. Z.—Sealed proposals will be received by the Panama R.R. Co., until 12 o'clock noon, Nov. 24, for furnishing all or any part of the company's requirements, estimated at 500,000 tons of coal, as required during the year ending Dec. 15, 1915. Coal is to be of the best quality steaming, semi-bituminous, mine-run, with at least 40% lump, dry and free from slate, sulphur, dirt and other impurities, suitable and acceptable for use in stowage in the bunkers of steamers operating in tropical waters and susceptible of being stored in the climate of Panama without danger of fire through spontaneous combustion. Prices are to be quoted f.o.b. any loading port the contractor may designate on the Atlantic or Gulf coast, and the contractor will be notified on the twenty-fifth of each month of the amount required for the succeeding month. The contract will be awarded on a heat unit basis with a standard of not less than 70% fixed carbon and 14,700 B.t.u. per pound of dry coal. Bidders must state the commercial or trade name of the coal, together with the designation of the bed or beds and exact location of the mine from which they propose furnishing the coal. All bids must be accompanied by a certified check for $1000 and, upon formal execution of the contract, the company provides that security not to exceed $30,000 shall be required for the faithful performance thereof. Payment will be made 30 days after presentation of bills of lading signed by the captain of the collier accompanied by certificates of the companies operating the coal piers, indicating the number of cars and weight of each car load of coal dumped into the colliers. Contract form and specifications can be obtained on application to R. E. Rutherford, Assistant Purchasing Officer, Panama Purchasing Dept., 24 State St., New York.

COAL CONTRACTS LET

Contract No. 2—Norfolk, Va.—This government contract, previous notices, including bids of the various companies, having been published in this column, has been awarded to the Smokeless Fuel Co., under a guarantee of 14,800 B.t.u., at $2.63 per ton.

FOREIGN

Guayaquil, Ecuador, South America—La Compania de Alumdrado (Lighting Company) is in the market for 3500 tons of gas coal. Prosepctive bidders should state the specific gravity, weight per cubic foot, and space occupied by one ton of gas coal. Give approximate analysis, including moisture, fixed carbon, sulphur and ash, and a commercial analysis showing the gas per ton of coal, gas per cubic foot of coal, illuminating power of the gas in standard sperm candles, value of one cubic foot in grains of sperm, sperm value per ton of coal, coke per ton of coal (good quality), coke per cent. of coal, ash in coke, sulphur eliminated with the volatile products, sulphur in the coke, tar per ton of coal. Quotations should be c.i.f. Guayaquil. Address The Manager, Compania de Alumdrado, Guayaquil, Ecuador, South America.

South America—An American consular officer in that country has transmitted detailed information relative to tenders which will be received, until Nov. 1, for the supply of coal for government steamer service. American coal dealers who are interested should apply to the Bureau of Foreign and Domestic Commerce, mentioning item No. 14,016 for the reserved information.

South America—Supplementing a previous notice, the Bureau of Foreign and Domestic Commerce at Washington states that details regarding a certain inquiry from South America have been forwarded to the department, and that complete information, including blank forms on which to submit bids for supplying coal under the conditions specified can be had on application. All inquiries should mention item No. 14,048, and be addressed to the Bureau of Foreign and Domestic Commerce, at Washington, D. C.

Santiago, Chile, S. A.—Bids are wanted on 300,000 tons of coal a year during the next three years, according to press reports. The coal is to be used on the Chilean Railway. All communications should be addressed to the Department of Materials, Santiago, Chile, S. A.

Latin America—An American minister in Latin America has transmitted, by telegram, information relative to the coal market in his district. Full particulars may be had on application to the Bureau of Foreign and Domestic Commerce and its branch offices, by referring to their item No. 14,133.